UNIVERSITY OF ZULULAND

Proceedings of DLIS 9th Annual Conference

Theme

"EXTENDING AND DIVERSIFYING THE FRONTIERS OF INFORMATION STUDIES RESEARCH NATIONALLY"

Editors

Dennis N. Ocholla and Daisy Jacobs

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2008

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Ninth DLIS Conference September 5-6th 2008: Opening Remarks

We are very fortunate in 2008 to have hosted magnificent and prominent guests at the 9th DLIS annual conference. It is with pleasure that I welcomed our Key Note Speakers: Prof. Johannes Britz, Dean School of Information Studies, University of Wisconsin, Milwaukee; Prof. Stephen Mutula from the University of Botswana, who is a visiting professor in the LIS Department; Dr. Naresh Sentoo, Chair, Department of Information and Corporate Management, Durban University of Technology; our guest speaker, the Vice Rector of Research and Academic Affairs, Prof. Patrick Sibaya; all honoured guests from the Durban University of Technology; and all my colleagues and students.

Above all, our mission in scholarly conferences is to share knowledge and learn from one another. We wish to showcase our research work and achievements, familiarize ourselves with what our colleagues are doing, learn from the papers presented, increase our visibility, and interact and develop new research links and networks. The purpose of this (9th DLIS annual) conference was not necessarily different from those outlined, which is to promote knowledge sharing through constructive discourse amongst staff and students, and to popularize LIS research and publication.

Research is given special attention in the LIS Department. Except for the Diploma in Specialized Education - a School Librarianship degree programme that is offered to qualified teachers for school library development and management - all (five) of our qualification programmes have adequate or strong research components in the semester -long research courses that culminate in research reports or dissertations based on qualitative and/or quantitative research produced by our students. Our annual conferences have been drawing papers largely from leading research reports produced by both our undergraduate and postgraduate students (i.e. papers that have achieved distinctions or first class). Due to the increasing number of students in our postgraduate/graduate qualification programmes, we have been increasingly drawing our conference papers from postgraduate students and staff/faculties, which is commendable.We are proud to note that some of the research papers have received recognition both nationally and internationally. For example, since 2000, at least 7 of our students have presented papers at the Library and Information Association of South Africa (LIASA) conferences held annually in different cities and provinces in the country, and on numerous occasions, our students received awards for best papers. More recently (in 2006), our staff and students presented 37 papers at local (16), national (20), and international (2) conferences. Thus far, 2007 has seen staff and students deliver 25 papers, including 10 international papers (e.g. IFLA Durban, SA - 2; Moi University, Kenya – 3; Madrid, Spain – 1; Ethics Conference in Pretoria, SA - 4) and 15 local papers (Faculty of Arts Conference). I think that we are likely to maintain this rigour in 2009.

Research presentations are not the only thing we do, as we also publish our papers in peer-refereed journals. Since 2002, the department (with only five permanent staff members and a heavy teaching load) has consistently published an average of 5 peer refereed (SAPSE-government subsidized accredited journals) articles per year. One of our PhD students, Dr. Bosire Onyancha (currently based at the University of South Africa), who graduated in May 2007, published (in most cases in collaboration with a faculty member) the largest (12) number of quality research articles by a student at the university during his masters and doctoral work. The effort of staff, the graduate students and their supervisors, saw us publish 8 articles in (SAPSE) peer-refereed (accredited) journals in 2005, 6 in 2006, and 8 in 2007. In four consecutive years, our department has emerged as one of the three leading departments (of 48) in the university in terms of the number of publications in peer refereed journals, and generated over R570, 000.00 in 2005, R510, 000.00 in 2006 and R.650,000,00 in 2007 to the university through SAPSE subsidies. A substantial subsidy is paid to the institution of the authors affiliation by the government of South Africa through the Department of Education for each research unit (e.g. an article is one unit) published in accredited (largely pre-listed) journals/sources in order to develop and promote quality research. The year 2006 saw the department achieve the highest SAPSE subsidized publications output in the Faculty of Arts and the highest in the whole university. In 2007 we came first in the university in terms of research output through publications in peer-refereed journals and were awarded the certificate of recognition for research endeavor by the institution. One of our students received two research awards, and two of our staff members received one and five research awards for research endeavors and research honours respectively . As I write this, we have already produced 5 SAPSE AJ publications and are likely to exceed all our research output records in the previous years due to the diversification of research output through the increased involvement of staff/faculties and students in research endeavors and also because of the presence of our visiting professor, who is very prolific in research publications. We are also building on our postgraduate students for research output (at the moment, we have registered 3 Honours, 9 Masters and 12 PhD students) as we intensify collaborative research and publications between staff and students, thus promoting research and publication capacity building in LIS.

I am proud of our staff and students for these achievements, which could not and cannot occur without teamwork, mentorship, knowledge sharing, an empowerment mindset/paradigm, and action. I also appreciate the research support that we receive from the university in terms of funding for conferences, research output, and support for research initiatives. We undertake to continue with staff and student conferences in the future, encourage more participation from like-minded faculties and students from

all over the country, support the publication of good research papers in national and international peer-refereed journals and websites, and encourage quality LIS research and publication in diversified IS domains. The proceedings of the 2003, 2005 and 2007 conferences may be found in our departmental knowledge repository at http://www.lis.uzulu.ac.za/research#dlislisa.htm. The proceedings of this conference will be posted on our website by the end of 2008.

Thanks
Prof. Dennis Ocholla
5th September 2008

CONTENTS

Open Access: Challenges and Barriers to African scholars

Johannes Britz[1] britz@uwm.edu
University of Wisconsin-Milwaukee
University of Pretoria

Introduction

The price of journals (referring here to e-journals as well as hard copies) has risen dramatically over the past three decades, to the point that they can hardly be afforded by academic libraries in rich countries such as the USA. This evidently has even worse implications for academic libraries in Africa, and most of Africa's scholarly community therefore remains marginalized in terms of access to the global body of knowledge.

The introduction of the Internet, accompanied by the ability to digitize and manipulate information, has not only changed the knowledge and information landscape permanently, but also changed the publishing industry. It has, for the first time, become possible to reproduce and distribute information products and services at nearly zero marginal cost. The only requirement is access to a computer, the Internet and relevant websites. This new model has led to the global Open Access (OA) movement, whose main aim is to distribute scholarly journals free of charge to its end users. For the first time, there is therefore a real opportunity for African scholars to gain, free of charge (or at least at a very affordable cost), access to digital scholarly journals and the scholarly works of others. The OA movement has, however, not led to the free flow of information on the African continent. While expectations have been raised, there are still many stumbling blocks prohibiting African scholars from fully participating in and benefiting from the OA movement.

This paper will highlight some of these stumbling blocks, discussed within the moral framework of the right of access to information. The paper is structured in the following manner: First, the notion of OA will be discussed. Following this, I will elaborate on the right of access to information, thereby establishing the moral framework. The third and final part will address some of the challenges and obstacles facing African scholars regarding access to scholarly work via OA.

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[1] Johannes Britz, PhD, is Professor and Dean School of Information Studies, University of Wisconsin, Milwaukee, USA. He was the Key Note speaker at the Conference

Understanding the Moral Context: The Right of Access to Information and the Right to Communicate

The OA movement is in essence about providing scholars access to the works of others free of charge. It operates on the basic principles of the economics of information, allowing the reproduction and distribution of information products and services at nearly zero marginal cost (Evans and Wurster, 1997). It is, however, driven by a moral imperative that scholars have the right to the works of others, or in other words, the right of access to information, the right to communicate and the right to know. There is further a strong sense that these should be enabling (or affordable) rights. In the following paragraphs I will elaborate on these information-related rights.

Above all, communication is an essential human process that makes both individual expression and societal structure possible. Habermas (1989) and Fisher (1982) view access to information as a fundamental and necessary precondition for personal development and socio-economic participation. Benkler (2006) further argues that access to information and the ability to communicate are central to human freedom and human development. The new economics of information, introduced by modern Information and Communication Technologies (ICTs), have furthermore made it possible to communicate beyond face-to-face interaction and reach the entire globe by means of modern inventions such as electronic journals and e-mail. This is also the reason why Hamelink (2003) argues that we should move beyond information and knowledge societies towards communication societies. Human rights need to be updated to reflect these developments.

The argument that access to information is an instrumental and individual as well as social right not only implies the protection of this right, for example in a constitution and by means of legislation, but also the enabling of this right. One can further argue that society has a moral obligation and legal responsibility towards creating an accessible information infrastructure together with a legal regime that would allow citizens not only the protection of this right, but also the means and ways by which they can exercise it. Article 28 of the United Nations Declaration of Human Rights states: "Everyone is entitled to a social and international order in which the rights and freedoms set forth in this Declaration can be fully realized" (United Nations, 1997).

Based on these moral premises, it can therefore be argued that the distribution of scholarly journals in digital format should not be restricted by intellectual property regimes or by an economic model that does not support affordable access thereto.

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What is Open Access?

Before I elaborate on the obstacles that African scholars face with regard to OA, it is important to understand what is meant by open access. OA does not mean the free flow of free information, nor does it promote 'illegal' intellectual property-related activities. The Budapest Open Access Initiative defines OA as follows: "There are many degrees and kinds of wider and easier access to this literature. By 'open access' to this literature, we mean its free availability on the public Internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the Internet itself. The only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited" (http://www.soros.org/openaccess/read.shtml).

Peter Suber (2007) provides an excellent overview of open access that is published on the website (http://www.earlham.edu/~peters/fos/overview.htm). I summarize the most important aspects of OA based on his description.

- OA literature is mostly confined to scholarly publications and can be in any digital format, including text, movies and images;
- It is free of charge and also free of most intellectual property-related restrictions, including copyright and licensing. It does, however, protect the moral rights of authors as well as conditions for use – normally under the Creative Commons License;
- OA is therefore compatible with intellectual property regimes;
- It is not a new business model aiming to make money – it simply removes the pricing barrier faced by the end user of information;
- It recognizes the fact that there are still production costs involved;
- It is "royalty free literature". This is a concept coined by Peter Suber to capture the notion that authors make their works available without the expectation of payment or any other form of compensation;
- As with scholarly journals, OA is peer–reviewed;
- The main focus of OA is to make available, for free, tax-payer funded research;
- The two primary vehicles for the distribution of research articles are OA journals and OA archives and/or repositories;

- OA is not the same as universal access. There are still many restrictions in the OA environment, some of which include language barriers, censorship, lack of access to the Internet and handicap-related access barriers (Suber refers here to the fact that many websites still do not accommodate handicapped people); and
- OA serves the interest of many people and groups, including but not limited to users, authors, governments, funding agencies and libraries.

Challenges facing OA in Africa

In many ways, OA can provide the necessary solutions to the educational challenges faced on the African continent. For example, African academic libraries can subscribe to free OA journals, and scholars and researchers can access free content (be it in OA journals or OA repositories) on the Web.

There are, however, significant problems facing African academics regarding access to OA scholarly information. I mention a few.

Information infrastructure challenges

The first, and probably most important, is the lack of well developed information infrastructure. The backbone of any developed country operating in the global knowledge society is well-developed and maintained information infrastructure, i.e. infrastructure that not only enables the communication and sharing of information, but also the ability to participate in global, digital, economic and socio-political activities. Such information-based infrastructure must allow "…the spread of national, international and genuinely global information exchanges between banks, corporations, governments, universities and voluntary bodies…" (Webster, 2002:10).

Well developed and maintained information infrastructure covers a variety of issues and ranges from the traditional provision of libraries, publishers and booksellers, to the distribution of open access literature via the Internet. Naisbitt (1984:28) correctly points out that "…the computer technology is to the information age what mechanization was to the industrial revolution".

The problem is, of course, that nearly all countries in Africa lack such sophisticated information infrastructure. This has led to dire consequences for many of these countries as they are prevented from effectively participating in the global information-based economy and are in many instances excluded from unhindered access to OA literature. Kularatne (1997:118), in his critique on the developing world, comments: "Whether a

4

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coordinated and organised national information policy exists in a country or not, there are certain fundamental inadequacies in the information infrastructure of many Third World countries". Castells (1998) predicted a particularly bleak future for countries in sub-Saharan Africa. He referred to Africa's technological apartheid at the dawn of the information age caused by a lack of infrastructure or human capacity to deploy and utilize technology. It is worthwhile quoting Castells (1998:95) at length:

"Because of the inability of African countries to produce/use advanced technological equipment and know-how, their imbalance of trade becomes unsustainable, as the added value of technology – intensive goods and services – continues to increase vis-à-vis the value of raw materials and agricultural products, limiting their capacity to import inputs necessary to keep their commodity production systems in operation. It follows a downward spiral of competitiveness, as Africa becomes increasingly marginalized in the informational/global economy by the leap of technological change. The disinformation of Africa at the dawn of the Information Age may be the most lasting wound inflicted on this continent by new patterns of dependency, aggravated by the policies of the predatory state".

Even in cases where developing countries invest in modern ICT and the development of well-equipped and maintained information infrastructure, people are in many cases still excluded from accessing the most needed and relevant information. Due to the high cost of modern ICT, in particular connectivity costs, there is still a significant dichotomy between those who have the material means to access information and those who don't. The United Nations Development Program Report (UNDP) (1999:63) refers to this dichotomy as follows: "The network society is creating parallel communication systems: one for those with income, education and literally connections, giving plentiful information at a low cost and high speed, the other for those without connections, blocked by high barriers of time, cost and uncertainty and dependent upon outdated information". A strong argument can therefore be made to support the notion that Africa is mostly excluded from global knowledge sharing via OA.

Telecommunication costs

Although OA does not charge the end user, there are still production and communication costs involved. Accessing OA journals presupposes the availability of an Internet connection. The problem is that the cost of telecommunications in Africa is the most expensive in the world. This is mainly due to the lack of affordable and regular access to the Internet and insufficient policies regulating the telecommunications sectors. Broadband access tends to be unavailable, and when available, is a luxury that cannot be afforded by most people. In support of this argument, I quote part of a report released by ResearchICTAfrica.net on the Internet costs in Africa:

> "In most countries in Europe and in the U.S.A., the prices of high speed Internet connections have declined dramatically in the last few years. Where ASDL technology is available, the cost per month for a 512 kbps. line is 25 to 40 USD per month. Dial-up lines cost about the same, if you include telephone charges for 15-25 hours per month. In Africa, the cost of a dial-up connection is similar or often more expensive than in Europe, but only gives half the performance. A shared fixed line – often called a VPN (Virtual Private Network) – will often cost 300 to 500 USD, for a very mediocre performance. If you also consider the vast difference in incomes between most African countries and Europe, the difference becomes even greater. Measured as the number of hours you must work to pay for an Internet connection, a user in Africa is disadvantaged by a factor of 100 or more" (ResearchICTAfrica.net, 2005).

SouthAfrica is a telling example of the high cost of telecommunications. Telkom has been the sole, fixed-line telecommunications operator in South Africa since 1991. For a population of more than 40 million, Telkom serves only around 2.4 million residential customers (Telkom, 2006:4). Corporate customers include "more than 200 of the country's largest financial, retail, manufacturing and mining companies with domestic and international operations and approximately 550,000 large, medium and small businesses" (Telkom, 2006:4). Even with such a relatively small customer base, Telkom has clearly used its monopoly to its advantage - since the year 2000, its operating profit margin increased from R1.54 billion to just over R9 billion in the fiscal year ending in 2007. In order to achieve such profit margins, telecommunications' costs clearly must be high; in fact the telecommunications cost in South Africa is currently one of the highest in the world, and numerous studies have found that Telkom's pricing is excessive (Yankee Group, 2003; Efficient Research, 2004; Genesis Analytics, 2004). The 2000-2004 timeframe revealed the following about the cost of telecommunications in South Africa:

- The most expensive country for local call rates;
- The most expensive country for national call rates;
- The most expensive country for international calls; and
- Local call costs rose by 10.5% in 2000, 16% in 2001, 24% in 2002, and 12.5% in 2003.

This has had a severe effect on the financial ability of many scholars and universities to access OA journals online.

Censorship

In his analysis of OA, Stuber argued that censorship can be a barrier to the access of OA journals. This appears to be the case in some African countries. In a number of democratic African countries, governments still

6

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control access to the Internet, usually by allowing only one ISP that is controlled by the state. Libya, Tunisia, Sierra Leone, Zimbabwe and Sudan are among the top 20 countries in the world where access to the Internet is most controlled (de Beer, 2001).

Language and level of literacy

The language used on the Internet is another barrier to OA journals. Most OA journals are in English. However Africans are, to a certain degree, in a privileged position when it comes to language and access to the global body of knowledge. A large number of Africans living on the continent can speak or understand either French or English, two international languages that have a prominent representation on the Internet. Furthermore, both languages are the dominant political, economic and scientific languages on the continent. The drawback is the low level of literacy (Britz, *et al.*, 2006). In 2005, the average rate of illiteracy on the African continent was 35%. The only hopeful signifier was that the average illiteracy rate of people between the ages of 15-24 was substantially lower at 20% in the same year (African Economic Outlook, 2005:581).

Lack of knowledge

One of the problems facing the OA movement is the fact that many researchers and scholars are not fully aware of the existence of OA journals, and in cases where they are, couple this awareness with mistrust. There is a perception that OA journals are not of the same academic value as 'traditional' journals. This has a two way effect: scholars are reluctant to publish in these journals and are also reluctant to use these journals as part of their research. Currently, there is a worldwide initiative to change this perception of OA journals.

Conclusion

In this paper, I have argued that OA journals provide an ideal opportunity for African scholars to gain access to the global body of scholarly research. OA journals offer a much better economic alternative than the current pricing structure of traditional publishers, and allow access online to anyone that has access to the Internet wherever they are in Africa.

As cited there are, however, certain barriers to OA journals, and OA can certainly not be equated to universal access. The conclusion drawn from this is that African scholars are still in many ways marginalized when it comes to the access and use of OA scholarly materials.

References

African Economic Outlook. 2006. OECD Publication. Paris: African Development Bank.

Becker, K. 2003. Why intellectual property issues matter? *World Information,* special IP edition, (10-12 December 2003): 1

Britz, J.J. 2006. *A critical analysis of information poverty from a social justice perspective.* PhD Dissertation: University of Pretoria: Pretoria.

Castells, M. 1998. End of millennium. In: *The information age: economy, society and culture*, vol. III. Malden: Blackwell.

Evans, P. B. & Wurster, T. S. 1997. Strategies and the new economics of information. *Harvard Business Review*, (September): 71-82.

Habermas, J. 1989. *The structural transformation of the public sphere*, translated by T. Burger. Cambridge, MA: MIT Press.

Hamelink, C. J. 2003. Moral challenges in the information society. *Media Development,* XLX(4): 40-43.

Kularatne, E. D. T. 1997. Information needs and information provision in developing countries. *Information for Development*, 13(3): 117-121.

Naisbitt, J. 1984. *Megatrends: ten new directions transforming our lives.* New York: Warner books

ResearchICTAfrica.net. 2005*. Why is the Internet expensive in Africa?* [Online].Available from: http://www.researchictafrica.net/modules.php?op=modload&name=News&file=article&sid=301.

Suber, P. 2007. Open Access Overview. Available from: http://www.earlham.edu/~peters/fos/overview.htm

Telkom. (2006). *Telkom Corporate Profile* [online]. November 2006. Availablefrom:http://www.telkom.co.za/pls/portal/docs/page/contents/common/aboutus/Telkom_profile23_01_07.pdf

United Nations Development Programme, 1999. *Poverty report.* New York: United Nations Publications.

Webster, F. 2002. *Theories of the information society*, second edition. London: Routledge

8

Teaching and Learning of Information Literacy in Institutions of Higher learning in KwaZulu-Natal and Malawi.

George Theodore Chipeta[2] georgechipeta@yahoo.com , Daisy Jacobs[3] djacobs@pan.uzulu.ac.za   and Janneke Mostert[4] – jmostert@pan.uzulu.ac.za
Department of Library and Information Science, University of Zululand

Abstract.
Information Literacy (IL) is a set of abilities that enable individuals to recognise when information is needed and to subsequently locate, evaluate, and utilise the required information. It enables people to interpret and make informed judgments as users of information sources, and also enables them to become producers of information in their own right and thereby become more active participants in society. Information Literacy is the basis of lifelong learning. It is common across all disciplines, all learning environments, and all levels of education. This study, which was conducted among academic and library staff and students at the University of Zululand (Unizul) and the Durban University of Technology (DUT) in KwaZulu-Natal (SA) and Mzuzu University (Mzuni) in Malawi, reports on the offering and teaching of IL in these institutions of higher learning. The findings reveal that IL is offered and taught as a module at Unizul and as a course at Mzuni by their respective Departments of Library and Information Science, though not across all the faculties At DUT, IL is only offered and taught by the library during the (campus wide) Library Orientation programme. Problems encountered in the teaching and learning of IL include inadequate time, lack of computer skills, inadequate venues and equipment for teaching and students' practicals, and lack of cooperation. The study recommends that the module or course of IL should be incorporated into the university curricula of all three institutions, and the DUT should introduce a dedicated module or course in Information Literacy and embed it into the students' course materials. The three universities should also advertise to academic staff, students and decision makers, the importance of having modules or courses in IL.

1. Introduction

Tertiary institutions are centers of learning and knowledge generation. This means that students, academic staff, administrative staff, researchers and librarians work with information. It is imperative for students to therefore be able to independently search, identify, locate, retrieve and use information. This is noted by Barton (n.d: 1-2), who opines that information literate students access, evaluate and use information from a variety of sources, communicate effectively, and reflect on the process as well as the

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[2] George Chipeta completed his Masters study in the Department of Library and Information Science at the University of Zululand, South Africa.

[3] Daisy Jacobs, PhD, is a Senior Lecturer in the Department of Library and Information Science, University of Zululand, South Africa. She is the supervisor of the research project.

[4] Janneke Mostert, PhD, is a Senior Lecturer in the Department of Library and Information Science, University of Zululand, South Africa. She was the second/co- supervisor of the project.

product. Therefore, a deliberate program for the teaching and learning of Information Literacy – defined by the American Library Association (ALA, 2007: 1) as "a set of abilities which enable individuals to recognise when information is needed, and possessing the ability to locate, evaluate, and utilise the needed information" - should be incorporated in all universities' curricula. One of the researchers - based on his experience as a student assistant in the Department of Library and Information Science and in the Library at the University of Zululand, and as an assistant lecturer at Mzuzu University in Malawi - observed that most undergraduate students do not posses the skills necessary to conduct their research and search for information. They rely heavily on their lecture notes and library staff in their search for information, despite having been taught and equipped with IL skills during their first year at the university. One is thus led to ask: What and where is the problem? Why are students not performing as expected with regard to the application of IL? It is the intention of this study to reveal, among other findings, how valuable the course is.

The study included two institutions of higher learning in the KwaZulu–Natal province, namely the University of Zululand (Unizul), which is situated 15 km outside Empangeni, the Durban University of Technology (DUT) in Durban, and the Mzuzu University (Mzuni) in Mzuzu, Malawi. The Unizul and DUT were selected because they represent various groupings in the country. The Unizul is a comprehensive rural-based university and is regarded as a historically disadvantaged institution, while the DUT is urban-based and is considered to be a historically advantaged institution. Mzuni represents both urban and rural settings. The study excluded the other institutions in South Africa and Malawi because distance, cost and time prevented their selection.

The purpose of this study was to investigate the teaching and learning of Information Literacy in institutions of higher learning in KwaZulu-Natal (SA) and Malawi. Specifically, the study intended to achieve the following objectives:

- To determine the offer and teaching of IL.
- To ascertain the learning of Information Literacy.
- To establish who is responsible for the teaching of Information Literacy or library orientation programmes.
- To determine students' perception
  of the ability to independently identify, locate, retrieve and use information sources.
- To establish the problems faced in the teaching and learning of information or library orientation programmes.

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- To make recommendations to the curriculum developers and concerned departments at the universities regarding the effective teaching and learning of Information Literacy.

2. Literature Review

Technological advancement has resulted in the proliferation of information to the point that most individuals find themselves faced with diverse, abundant information choices in all spheres of life, be it in their academic studies, places of work, or in their personal lives. This information is readily available in libraries, community resources, special interest organisations, the media, and the Internet. Increasingly, information comes to individuals in unfiltered formats, raising questions about its authenticity, validity, and reliability (ALA, 2007:2).

According to CILIP (2006:n.p), IL is the part of knowledge or learning that centres on the acquisition of a series of skills or competencies. An information literate individual cares about the quality of the answer to what he/she is investigating, and is prepared to work to guarantee that quality. Information Literacy is relevant, and is viewed as an important skill to be learned and used in primary and secondary schools, in further and higher education, and in business and leisure (CILIP, 2006: n.p).

Benchmarking Information Literacy in institutions of higher learning.

According to De Jager and Nassimbeni (2002:3), benchmarking is a strategic assessment tool commonly practiced in the business sector environment. It essentially consists of comparing best practices with one's own practice in order to ensure continuous improvement and attain excellence. An important product of such an initiative is "the discovery of innovative approaches … as enhancement of current practices is rarely sufficient to ensure future excellence" (Meade in De Jager and Nassimbeni, 2002:3).

According to the Council of Australian University Librarians (CAUL, 2001:4), Information Literacy standards provide a framework for those wishing to embed IL in the design and teaching of educational programs. In addition, the standards outline the process by which academics and librarians assess specific indicators showing whether or not an individual is information literate. These standards are equally useful to the students because they provide a framework for their interaction with information in any given environment. The standards also help to develop their awareness of the need for a meta-cognitive approach to learning, making them conscious

of the explicit actions required in order to recognize need, and gather, analyze and use information. The 'Seven Pillars of Information Literacy', for example, describe outcomes and provide examples of students' progress on their path to becoming information literate. The outcomes serve as guidelines for academics and librarians in developing local methods for measuring students' learning.

Information Literacy models

Azmi (n.d: 149) notes that because Information Literacy augments students' competency in the evaluation, management and use of information, it is now considered by several regional and discipline-based accreditation associations to be a very important competency in university students. These benchmarks or standards are explained as part of the Information Literacy models, of which several are in use today.

Top among them is the 'Seven Pillars of Information Literacy model', developed by the SCONUL advisory committee on Information Literacy (1999:6) [provided below].

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Figure 1. Information skills model (Sourced from SCONUL position paper, 1999)
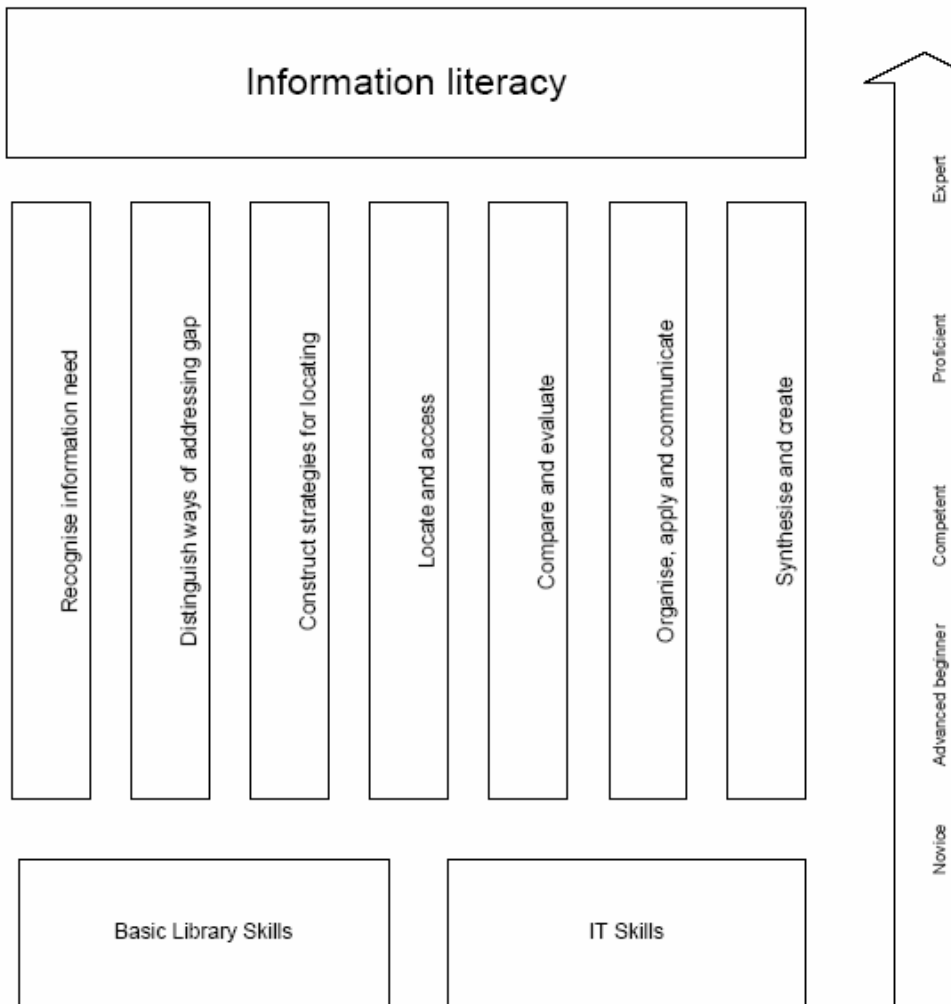
An attempt shall be made to compare this model with a few other Information Literacy models, namely the Big6 Skills model by Eisenberg and Bob Berkowitz (1990), Information Search process by Kuhlthau (1993), Research Process Model by Stripling and Pitts (1988), and Pathways to Knowledge by Pappas and Tepe (2002). The Seven Pillars of Information Literacy model has seven competence levels, explained below.

- *The ability to recognise a need for information.*

This is considered to be the first stage in the information seeking process. An information user is characterized as 'blank' in terms of their awareness of what their information needs are. According to Mostert (2004:124), the term 'need' can be defined as an individual's sense of the lack of something. Belkin (in Kituyi-Kwake, 2007:82) notes that an information need is present when a gap, uncertainty or deficiency in a person's cognitive state is recognised. Belkin adds that this deficiency prevents a person from making sense of the surrounding world, and to this end it is described as an "Anomalous State of knowledge" (ASK). This compares to task definition in the Big6 Skills model, wherein a user determines exactly what the problem is and the specific information needs related to the problem. It also relates to task initiation in Kuhlthau's Information Seeking Process. This is the stage at which an individual first becomes aware of the lack of knowledge necessary to accomplish an assignment, and often feelings of uncertainty and apprehension ensue. At this stage, the task is to recognise a need for information. In order to address the problem, a person is driven to seek information by, for instance, discussing ideas with others, including peers and experts, and browsing through different sources to identify a research topic or other information need. This in turn leads the information seeker to explore general information resources to increase familiarity with the topic. Often this also involves brainstorming, thinking about possible topics and tolerating uncertainty. The information seeker then selects the topic for research. A person chooses a broad topic and gets an overview of the topic, also known as recalling, which entails fact-finding, such as "reporting on the information" in Strippling and Pitts' Research Process model (1988: n.p) [also known as REACTS]. In other words, it involves searching for answers by posing questions, such as whether or not the topic chosen will meet the user's research interests; and finding answers to such questions. It also entails exploring various forms of literature by reading, watching and listening. In their model, Pappas and Tepe (2002: 1-2) consider this to be the stage of appreciation and enjoyment. Appreciation and enjoyment entail an awareness of one's information requirements. The authors argue that appreciation fosters curiosity and imagination, which in turn lead to discovery in an information seeking activity. As information users go through the stages of information seeking by viewing, listening, and reading, their appreciation grows and matures.

- *The ability to distinguish ways in which the information gap may be addressed.*

The second step of the information process in the Seven Pillars of Information Literacy model entails an information user being knowledgeable about both print and non-print information resources, selecting the

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information resources that would accomplish a user's research task, and being able to understand issues affecting access to such resources (Sconul, 1999:7). Baker (2005:1-2) compares this stage to "formulating questions that would guide research and planning for research production" in Pitts and Strippling's (1998:np) Research Process model, and the pre-search stage in Pappas and Tepe's (2002:1-2) Pathways to Knowledge model. Baker (2005:5) opines that the Research Process model stage involves analysing, through examination, whether the questions lay a good foundation for the research task and whether the research plan is feasible. The researcher then organises the information to fit the research task at hand.

During the pre-search stage, Pappas and Tepe (2002:2) are of the opinion that information seekers are able to make a connection between their topic and the knowledge that they already have in order to explore the relationships between subtopics. This purports the information seekers' questioning what they know about their topic and what they would wish to know.

- *The ability to construct strategies for locating information.*

The third step in the Seven Pillars of Information Literacy model consists of articulating information needs to match information sources, developing a systematic method appropriate to the information needs, and understanding the principles of construction and generation of databases. Baker (2005:1-2) compares this stage to the information seeking strategies of the Big6 Skills model and 'search' in the Pathways to Knowledge model. During information seeking, and in order for an individual to find topic ideas or the amount of information needed, he/she would need to consult various forms of literature, such as journal articles and books, on his/her subject. This also means acquiring a wide range of information sources and selecting the best from all the possibilities. This entails the seeker's assessment of the value of various types of print and electronic resources, such as CD-ROMS, databases, browsing the Online Public Access Catalogue (OPAC) and so on.

- *The ability to locate and access information.*

Stage four states that an information user should be able to develop an appropriate search technique, such as the use of Boolean operators, communication and information technologies, appropriate indexing and abstracting services, and citation indexes and databases; and use current awareness methods to keep up to date. The stages that fit here include the Big6 Skills' "location and access"; "find, analyse and evaluate resources" in Pitts and Strippling's Research Process model; and "search" in the Pathways to Knowledge model. Eisenberg and Berkowitz (1990:n.p) note that this stage

is concerned with the individual selecting the most appropriate investigative methods by developing a research plan, and by identifying keywords, synonyms and terms related to the information needed. The user thereafter constructs a search strategy using appropriate commands for the information access tool(s) selected, such as the use of the Boolean operators" AND", "OR" and "NOT", truncation, proximity operators for databases/search engines and the use of OPAC, indexes and abstracts. He or she goes on to retrieve information in a variety of formats using various information access tools, classification schemes and other systems, such as call number systems or indexes, to locate information resources within a library. In the search stage of the Pathways to Knowledge model, Pappas and Tepe (2002:3) state that information seekers identify appropriate information providers such as libraries, records and archives centers, museums and so on; select information resources and tools such as indexes, people, the Internet, the media and reference resources; and then plan and implement a search strategy to find information relevant to their research question or information needs. This they can do by scanning, conducting interviews and confirming information sources, recording information in order to determine its relevance, and exploring and browsing widely.

- *The ability to compare and evaluate information obtained from different sources.*

The fifth stage of the Seven Pillars of Information Literacy model signifies that users of information should be aware of bias and authority issues, the peer review process of scholarly publishing, and the appropriate extraction of relevant information. This can be compared to "evaluation" in the Big6 skills model, "search closure" in Kuhlthau's Information Search Process, "evaluating evidence or taking notes and compiling a bibliography" in the Research Process Model, and "interpretation" in Pathways to Knowledge. Eisenberg and Berkowitz (1990:n.p) observe that the information seeker assesses the quantity, quality, and relevance of the search results in order to determine whether alternative information access tools or investigative methods should be utilized; identify the gaps in the information retrieved; and determine if the search strategy should be revised. The information seeker repeats the search using the revised strategy if or when necessary, summarizes the main ideas extracted from the information gathered, and examines and compares information from various sources in order to evaluate their reliability, validity, accuracy, authority, timeliness, point of view and/or bias. He or she should also be able to recognise the cultural, physical or other contexts in which the information was created, and understand the impact of context when interpreting the information. At this stage, the information seeker may feel a sense of relief, satisfaction or disappointment. In the context of academic institutions, a researcher or student rechecks sources for information that might have gone unnoticed

8

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from the outset and confirms information and bibliographic citations relevant to the focus and research question. Strategies used here include returning to the library to sum up the search and keeping books until completion to recheck information.

As for "evaluating evidence or taking notes and compiling a bibliography" in the Research Process model, Baker (2005:5) writes that this involves judging information on the basis of authority, significance, bias and other factors.

- *The ability to organise, apply and communicate information to others in ways appropriate to the situation.*

This stage calls for people in academia to cite bibliographic references in their academic works, construct a personal bibliographic system, apply information to the problem at hand, communicate information effectively using the appropriate medium, and understand issues pertaining to copyright and plagiarism (SCONUL, 1999:6). This can be translated to "information use" in the Big6 Skills model and "communication" in the Pathways to Knowledge model. According to Pappas and Tepe (2002:3), the communication stage allows users to organize and present new knowledge as it relates to their research questions or information needs. In applying information, individuals choose an appropriate communication format and respect intellectual property. In sharing knowledge, the information user composes, designs, edits, revises and uses the most effective medium (e.g. videos, reports and animation) to convey the information. The information user should also understand the cultural, ethical, legal, and socio-economic issues surrounding information, and identify and articulate issues that relate to privacy. In addition, he/she needs to note security in both the print and electronic environments, identify and articulate issues in relation to free versus fee-based access to information, identify and discuss issues in relation to censorship and freedom of speech, and demonstrate an understanding of intellectual property, copyright and the fair use of copy written materials. In order to avoid issues of plagiarism, the information user should acknowledge the use of information sources by selecting an appropriate citation style in project reports and theses.

The ability to synthesise and build upon existing information, contributing to the creation of new knowledge.

"Synthesis" in the Big6 Skills model by Eisenberg and Berkowitz, "presentation" in Information Search Process by Kuhlthau, and "establish conclusions/organise information in outline and create and present final product" in the Research Process model by Pitts and Striplling fit in the

9

seventh stage of the Seven Pillars model. In synthesizing information, according to Eisenberg and Berkowitz (1990:n.p), the information user brings information together and links what he/she has learnt to what he/she already knows. The individual chooses a communication medium and format that best supports the purposes of the product and the intended audience. In the case of a researcher or student, this is accomplished by writing a draft that links various bits and pieces of information into one coherent whole, and revising the draft a number of times in order to improve its coherence before submission. Kuhlthau (1993:n.p), however, views this stage as presentation. This is when the task is to complete the search and to accomplish the assignment. A sense of relief is common, with satisfaction if the search has gone well or disappointment if it has not. Finally, the information user has to combine concepts in order to make potentially useful primary statements with supporting evidence; and integrate the prior and new information, including words and ideas, in a manner that supports the purposes of the project. By establishing conclusions and organising information in an outline, an information user, according to Pitts and Strippling (1988: n.p), draws conclusions by creating a personal perspective based on the information obtained. The outline should logically organise conclusions and evidence. In creating and presenting the final product, Pitts and Strippling (1988: n.p) are of the view that this should reflect whether or not the content is satisfactory.

3. The offer and teaching of Information Literacy in South African Institutions of higher learning.

There are several information literacy (IL) initiatives in South Africa. One such initiative, the most prominent in fact, was the Information Literacy (INFOLIT) project established in 1995. According to Underwood (2002:5), the primary objectives of INFOLIT were to promote the concept, value and importance of information literacy and to launch a series of pilot projects, and explore and establish a means of spreading information literacy education in the Western Cape region. The tangible outcomes of the INFOLIT project have been the recognition of the importance of IL at the University of Stellenbosch, University of Cape Town, Peninsula Tecknikon, Cape Tecknikon and the University of the Western Cape. The INFOLIT project also culminated in sponsoring the development of a web–based IL course. The site is meant to help users find, evaluate, use and communicate information. It is available at all the tertiary institutions in the Western Cape Province (Underwood, 2002:7). Underwood (2002:8), reports that the INFOLIT project also led to the establishment of a Centre for Information Literacy at the University of Cape Town. The members of staff at the Centre are responsible for working with the academic staff of all the universities' faculties in order to develop strategies for the integration of IL within the faculties' curricula. A series of discipline-based workshops on web searching were developed using a

template. The workshops were delivered on request to academic and library staff and students at each of the five institutions in the cape region (Underwood (2002:8).

De Jager, Nassimbeni and Underwood (2007: 143) narrate that most institutions of higher learning offer library orientation or training that focuses on the use of the OPAC, electronic databases, citations and referencing. De Jager, Nassimbeni and Underwood also note that there is growing evidence of a greater number of IL modules being embedded into various curricula. While most of the courses are still generic, stand-alone courses, others are credit bearing. Most institutions have a librarian whose primary responsibility is IL education, very often supported by subject librarians who offer training in their specific fields or disciplines. Some of the training is delivered in classrooms or computer laboratories, while other forms of training are offered virtually through platforms such as Web-CT. A training librarian makes the point, however, that at her institution they are unable to offer an online course because many of their students come "from rural areas, farms and townships where there are no libraries and computers" (De Jager, Nassimbeni and Underwood (2007: 143).

At the former Rand Afrikaans University, Molepo and Vuren (2005: 144) recount that the university launched a multimodal approach to teaching and learning in 2003. The multimodal approach was aimed at optimization, learning and assessment, and has been defined as the use of different media or modes of delivery of teaching. The different media and technologies used in this integrated, multimodal learning environment include: lectures, support from tutors, paper-based learning guides, interactive CDs, textbooks, videos, videoconferencing and the Web (electronic classes based on WebCT software which are offered to students via the Edulink virtual learning environment portal).

At Monash University (South Africa), Kibirige (2005: 131) gives an account of the learning and teaching processes that involve, in some instances, lecturers arranging for customised classes for groups of students for search assistance related to a specific assignment. Such a session covers the Voyager catalogues as well as reference works, search strategies and online databases relevant to an essay topic. There is a liaison between the library and the Center for Learning and Teaching, and some lecturers attend IL workshops delivered to subject groups on an ad hoc basis. The other process works through curriculum integrated sessions, in which there is one formally scheduled session on the academic timetable - a two- hour class on "Doing research on the Internet" - as part of a first year course in contemporary studies. Students complete an assignment for credit towards

their semester mark, and develop the skills that are necessary for effective Internet research by completing specific exercises. This model could be extended to other course units (Kibirige, 2005: 131).

4. Methodology

Qualitative and quantitative approaches were both used in this study, in the form of a survey and observations for data collection from the students, and interviews in the case of academic and library staff. A quota sampling technique was used to select 408 students, of whom 287 responded. A sampling ratio of 1.3% was used across all three institutions to come up with the sample. The population in this study was first categorised according to faculty, level of study (whether undergraduate or post–graduate) and gender before being selected haphazardly. Permission had to be sought and granted from the institutions under investigation. For the survey, self administered questionnaires containing both open and closed ended questions in order to cater for both qualitative and quantitative responses were handed out. The researcher had to strategically place himself in the libraries and faculties of the university campuses under study in order to distribute and collect the questionnaires. Observations on the students' ability to search, locate and retrieve information were also done while the questionnaires were being distributed and filled in.

In terms of staff, the study used purposive sampling, which is also a judgemental form of sampling. The researcher, based on his knowledge of the population, handpicked the individuals according to their relevance to this study. The study targeted and interviewed 3 lecturers in the Departments of Library and Information Science (LIS) responsible for teaching Information Literacy and 3 library staff from the selected institutions. Lecturers in the Departments of LIS were targeted because most IL offerings and teachings are housed in their departments. Library staff were selected because libraries conduct orientation programmes in which some components of IL are taught. Hence their inclusion was viewed as important. Data was analyzed using the Statistical Package for Social Sciences (SPSS). The results were represented qualitatively and quantitatively using tables, graphs and percentages.

5. Results and Discussions.

This section presents the results and discussions of the major findings collated from three sets of data, namely questionnaires, observations of students' information-related behaviour, and interviews with academic and library staff from the three institutions. Issues that are considered to be of major importance are outlined below.

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5..1 The offer and teaching of Information Literacy.

This section set out to find, from the academic staff, whether the module or course of IL is offered and taught; the formulation, design and review of the IL syllabus; and whether it is reviewed and if so, how often it is reviewed. It also sought to determine the students' awareness of the availability of the course or module in Information Literacy, attendance of IL classes, title and code of the course or module, and the department responsible for the Information Literacy module or course.

5.2 Offer and teaching of Information Literacy

The offering of the course of IL in the universities under study was considered to be of great significance in this paper, because it lays the foundation for the teaching and inculcation of IL skills in the students. As already observed, Information Literacy is offered and taught as a module or course by the Departments of Library and Information Science at the University of Zululand and Mzuzu University, where it is also embedded in the departments' curricula. At the Durban University of Technology, IL is taught in the library during the library orientation programme. Parker (2003: n.p.), and Orr, Appleton and Wallin (2001:n.p) advocate for the total integration of IL into students' course materials. The IL module or course should be for marks, and should be devised on the basis of collaboration between library staff and academic colleagues. This is often considered by practitioners to be the most effective method for students to develop their level of IL because it ties it into all student experiences.

5.3 Formulation, design and review of the module or course of Information Literacy.

The best practice for the design and review of the curriculum is through the involvement of various stakeholders, such as librarians, administrators, lecturers, and curriculum designers; in the hosting of a workshop, as is the case at Mzuzu University. Participants can deliberate and come up with a curriculum that is acceptable to all parties. This differs from the approach used at the University of Zululand, where the module of IL is designed and reviewed periodically by the lecturer concerned in consultation with the Head of the LIS Department. At Mzuzu University, the lecturers in the Department [of LIS] and librarians from across the country are responsible for the design and formulation of the IL curriculum. This curriculum is developed through a curriculum development workshop and reviewed annually.

This approach is similar to what occurred at the Open University in the United Kingdom, where during the design of 'Making Sense of Information in the Connected Age' (MOSAIC) - an assessed, credit bearing

short course in Information Literacy - a number of stakeholders were involved. Parker (2003:n.p) notes that development was made possible as a result of collaboration between academic and library staff, academic advisors from the Faculty of Education and Language studies, and the Centre for Outcomes-Based Education; with input from members of the SCONUL Advisory Committee who critically read the course.

5..4 Students' awareness of the course or module in Information Literacy.
Results in Table 1 show that at the University of Zululand and Mzuzu University, only a small number (31; 11%) of the 287 respondents were aware of the formal course or module in IL. Quite possibly, this is because the module or course is offered to students in the Departments of Library and Information Science and Communication and Agriculture Science at the University of Zululand, and the Department of Library and Information Science only at Mzuzu University; as a stand-alone module or course, since it is not integrated into other departments' curricula. The rest (194; 68%) of the respondents indicated that they did not know about the availability of the course or module in IL.

It follows that most respondents probably do not take the module or course of Information Literacy as they are not aware of it.
A further explanation is provided in section 5.1.3.

14

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- A = Aware, NA= Not aware, DNK= Do not Know

Table 1. Awareness of the Course or Module in Information Literacy (N= 287)

Faculty	Unizul						DUT						Mzuni		
	A		NA		DnK		A		NA		DnK		A	NA	DnK
	F	%	F	%	F	%	F	%	F	%	F	%	F	F	F
Arts	12	13	0	0	11	12	0	0	12	7	30	17	0	0	0
Science and Agriculture	7	8	0	0	15	17	0	0	0	0	0	0	0	0	0
Education	1	1	6	7	13	15	0	0	0	0	0	0	2	0	2
Commerce, Law and Administration	0	0	2	2	22	25	0	0	0	0	0	0	0	0	0
Accounting and Informatics	0	0	0	0	0	0	3	2	14	8	33	18	0	0	0
Engineering, Science and the Built Environment	0	0	0	0	0	0	1	1	8	4	33	18	0	0	0
Health Sciences	0	0	0	0	0	0	0	0	18	10	28	16	0	0	3
Information Science and communications	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0
Environmental Sciences	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1
Hospitality and Tourism Management	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Total	20	22	8	9	61	69	4	2	52	29	124	69	7	2	9

5.5 Attendance of a formal course or module in Information Literacy.

Responses to the attendance of a formal course or module in IL by students at the three institutions, presented in Table 2 on the next page, indicate that only 18 (28%) of the respondents from the three institutions were attending a formal course or module in Information Literacy. The majority (269; 94%) indicated that they did not attend a formal course or module in Information Literacy.

As mentioned under 5.4 (students' awareness), the module or course is offered to students in the Departments of Library and Information Science and Communication and Agriculture Science at the University of Zululand, and to students in the Department of Library and Information Science only at Mzuzu University. In both instances, the course/module is not offered campus wide. Allen (2000: n.p) notes that universities need to introduce campus wide IL programmes in order to produce graduates who are able to find, evaluate and use information efficiently. For this to happen, administrators must set the tone for the entire campus by incorporating IL into the undergraduate curriculum and developing programs that immerse students in IL throughout their undergraduate years. Azmi (n.d: 159), Orr, Appleton and Wallin (2001:n.p), Skov and Skærbak (2003: n.p.), and Parker (2003: n.p.) agree that the best model is the total integration of Information Literacy across the entire curriculum, where IL is embedded into all the students' course materials.

Table 2. Attendance of a formal course or module in Information Literacy (N= 287)

Faculty	Unizul				DUT				Mzuni	
	Yes		No		Yes		No		Yes	No
	Fre	%	Fre	%	Fre	%	Fre	%	Fre	Fre
Arts	10	11	13	15	0	0	42	23	0	0
Science and Agriculture	4	5	18	20	0	0	0	0	0	0
Education	0	0	20	22	0	0	0	0	0	4
Commerce and Administration	0	0	24	27	0	0	0	0	0	0
Accounting and Informatics	0	0	0	0	2	1	48	27	0	0
Engineering, Science and the Built Environment	0	0	0	0	0	0	42	23	0	0
Health Sciences	0	0	0	0	0	0	46	26	0	3
Information Science and communications	0	0	0	0	0	0	0	0	2	2
Environmental Sciences	0	0	0	0	0	0	0	0	0	4
Hospitality and Tourism Management	0	0	0	0	0	0	0	0	0	3
Total	**14**	**16**	**75**	**84**	**2**	**1**	**178**	**99**	**2**	**16**

5.6 Title and code of the course or module.

Table 3. Title and code of the course or module (N= 287)

Title and code of the course/ module	Unizul				DUT				Mzuni	
	Response		No Response		Response		No Response		Response	No Response
	Fre	%	Fre	%	Fre	%	Fre	%	Fre	Fre
Information Literacy/ AIILOO/ AIILOI	14	16	75	84	0	0	0	0	0	0
Information Retrieval II	0	0	0	0	2	1	178	99	0	0
Information Literacy/ LIS 1204	0	0	0	0	0	0	0	0	2	16

Results in the table above show that when asked to state the title and code of the course or module, those who had indicated taking a formal course/module responded as follows: 14 (16%) respondents from the Unizul indicated that the title is Information Literacy and the code, AIILOO/ AIILO1; 2 (1%) respondents from DUT cited the name of the course as Information Retrieval II, but did not give the code of the course; and the 2 respondents from Mzuni indicated that the title is Information Literacy and the code, LIS 1204.

5.7 Learning modes offered by the course or module in Information Literacy.

The learning modes offered in the Information Literacy modules or courses (both theoretical and practical), as cited by the respondents, were lectures in class, group discussions, and hands-on use of the library (i.e. browsing and using the Open Access Public Catalogue and other library resources). The use of the theoretical mode as a stand alone form of teaching is inadequate as it does not allow self-directed learning and problem solving among students. Students exposed only to the theoretical mode do not become active participants in the processes of identifying, locating, retrieving and using information responsibly, for example by citing sources and writing references; hence the need to mix theory with practical learning modes. The use of different modes of delivery - such as lectures, group discussions and practicals - by academic teaching staff is therefore of critical importance.

18
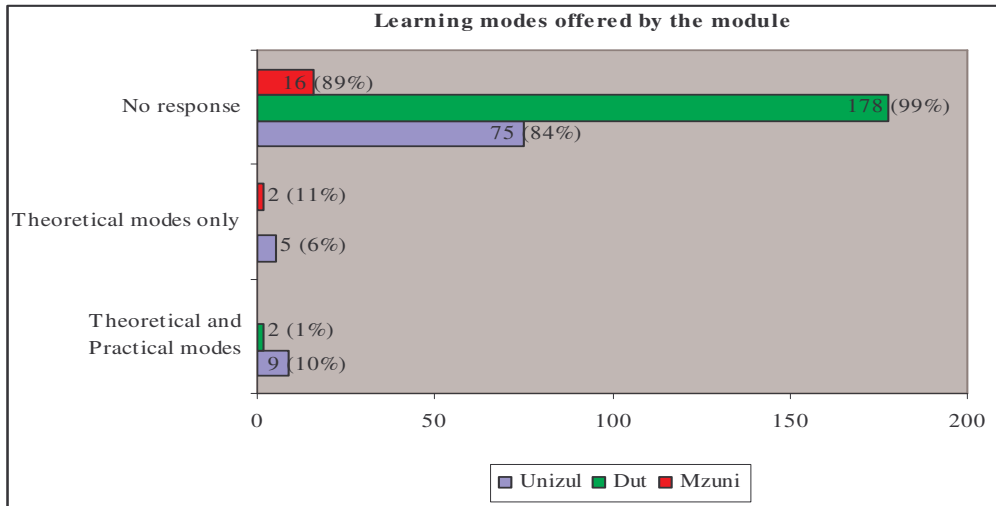
Figure 2: Learning modes offered by the module or course. N= (287)

5.8 Department responsible for teaching the Information Literacy module or course or library orientation programme.

Academic staff are employed largely to teach; therefore their responsibility is to design the Information Literacy syllabus, facilitate learning, teach students their areas of specialisation, reinforce what the students have been taught in Information Literacy, and provide students with exercises, assignments, tests and exams. This concurs with Allen's (2000:n.p) view that academic staff are facilitators of learning - helping their students evaluate information and fit it into the developing framework of knowledge in a given course.

It was found that at the University of Zululand and Mzuzu University, lecturers in the Departments of Library and Information Science are responsible for designing, reviewing and teaching IL modules or courses. On the other hand, library staff at both institutions are solely responsible for teaching the library orientation programme. They are responsible for imparting practical skills on students on how to use the library, and how to search, identify, locate and retrieve information using the OPAC. They also introduce students to indexing and abstracting tools and databases and writing citations and references. Librarians are considered to be the custodians of information resources. They know the operations of the library and the resources housed therein. The trend in the libraries at the three institutions is for senior members of the library staff to conduct or teach Information Literacy or the library orientation programme.

19

However, the academic and library staff ought to work together in the teaching of IL or the library orientation programme because their goal is the same, i.e. to impart IL skills on students that enable them to independently search, identify, retrieve and use information responsibly. This view is supported by Bruce (2002:13), who observes that IL is not possible without partnerships with students, information specialists, Information Technology specialists, curriculum designers and others. All stakeholders need to collaborate because there is no single group that can or should claim responsibility for the IL levels of students.

5.9 To determine students' perception of their ability to independently identify and locate services in the Library by using the OPAC, indexing and abstracting journals.

Results are presented in Table 3 on the next page.

Table 3 : Students' perception of their ability to independently identify and locate services in the Library by using the OPAC, indexing and abstracting journals.

(N=287)

Unizul

	With formal Information Literacy training (N=14)								Without formal Information Literacy training/ with library training/other modules or courses (N=75)							
Tool	Ident	Non Res	Loc	Non Res	Can Not Ident	Non Res	Can Not Loc	Non Res	Ident	Non Res	Loc	Non Res	Can Not Ident	Non Res	Can Not Loc	Non Res
	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
OP	14	0	14	0	0	14	0	14	8	67	8	67	27	48	27	48
Ind	10	4	10	4	4	10	4	10	4	71	4	71	42	33	42	33
AJ	7	7	6	8	7	7	8	6	3	72	3	72	50	25	50	25

DUT

	With formal Information Literacy training (N=2)								Without formal Information Literacy training / with library training/other modules or courses (N=187)							
Tool	Ident	Non Res	Loc	Non Res	Can Not Ident	Non Res	Can Not Loc	Non Res	Ident	Non Res	Loc	Non Res	Can Not Ident	Non Res	Can Not Loc	Non Res
	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
OP	2	0	2	0	0	2	0	2	131	56	131	56	20	167	20	167
Ind	0	2	0	2	0	2	0	2	100	87	100	87	0	187	0	187
AJ	0	2	0	2	0	2	0	2	40	147	40	147	0	187	0	187

Mzuni

	With formal Information Literacy training (N=2)								Without formal Information Literacy training/ with library training/other modules or courses (N=16)							
Tool	Ident	Non Res	Loc	Non Res	Can Not Ident	Non Res	Can Not Loc	Non Res	Ident	Non Res	Loc	Non Res	Can Not Ident	Non Res	Can Not Loc	Non Res
	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
OP	2	0	2	0	0	2	0	2	6	10	6	10	0	16	0	16
Ind	2	0	2	0	0	2	0	2	5	11	5	11	11	5	11	5
AJ	2	0	2	0	0	2	0	2	3	14	3	14	13	4	13	3

The results presented in Table 3 on the previous page show that the students' perception of their familiarity with the use of the OPAC at the DUT can be linked to the fact that subject librarians teach students IL in the library using retrieval tools such as the OPAC, and indexing and abstracting journals. At the University of Zululand, respondents' familiarity with the OPAC can be attributed to the skills they learnt from the module of Information Literacy and during the Library Orientation programme, where first timers in the university are taught how to use the OPAC and indexing and abstracting journals. At Mzuni, students who have not received formal Information Literacy training but have the perception that they can independently identify and locate collections in the library using the OPAC, could have acquired the skills from their first year of study in the course of Communication skills, which is compulsory at the university. In addition, during the library orientation programme, students are also taught how to search and retrieve information in the library using the OPAC and indexing and abstracting journals.

It was also observed that some of the respondents with formal training in IL showed, in their search for different information sources, that they were comfortable with using the OPAC by using different access points, such as the author, title and subject. They demonstrated that they were conversant with the location of books and were able to go to the shelf and locate the information materials they were looking for, although at times the materials identified were not on the shelf.

Those who didn't respond probably do not use the OPAC and indexing and abstracting journals. They instead go straight to the shelves to retrieve the materials that they need with the help of their friends.

Another trend noted at UniZul and Mzuni is that most of the students that had not received formal IL training had the perception that they did not have the ability to use indexing and abstracting journals. Perhaps other (non-LIS) academic departments are assigning fewer projects to students that require the exploration and use of library resources. Some students may also have been absconding from attending library orientation programmes because they felt they were not important, and are not marked as subjects. This could have contributed to their poor search skills. Alternatively, it could be that they were too busy with other activities to explore and learn what libraries have to offer.

5.10 Challenges faced in the teaching and learning of Information Literacy or the library orientation programme.

Some of the most common problems faced in the three institutions pertaining to the teaching and learning of IL include inadequate time, poor

computer skills, inadequate venues and equipment, lack of cooperation, and erratic network connections.

Time

Time plays a very important role in the teaching of IL. The shorter the period of teaching, the more likely it is that the teaching is ineffective, and therefore important information skills cannot be adequately imparted on the students. If, on the other hand, the teaching period is longer, there is a higher likelihood that students would grasp the topics under discussion.

Computer literacy

Some topics, such as the use of the OPAC, databases, search engines, and search and retrieval in the module or course of IL, involve the use of computers and the Internet. Students therefore need to be computer literate. The teaching of IL also requires a setting where there are computers for students' practicals. This contributes to a smooth teaching and learning environment. The shortage of equipment and venues means limited access to computers and a subsequent shortage of adequate practicals.

Collaboration

The lack of teamwork among academic teaching staff and library staff in teaching IL or the orientation programme was found to be a problem faced by the library staff. Lack of cooperation hinders the successful running of Information Literacy or Library Orientation programmes. This might result in friction, fighting for equipment and venues for teaching, and the duplication of the topics being taught.

6. Conclusion and Recommendations

The study revealed that Information Literacy is offered and taught as a module at Unizul and as a course at Mzuni by the Departments of Library and Information Science, although not across all the faculties. At DUT, Information Literacy is only offered and taught by the library during the university-wide Library Orientation programme. It was established that some lecturers in the Departments of Library and Information Science (LIS) take the lead in the design, formulation, review and teaching of the module or course of IL. Library staff were responsible for teaching Library Orientation Programmes at the three institutions. Some of the students alluded to the fact that they were aware of the availability of IL and attended the module or course. At both Unizul and Mzuni, the title of the module or course is Information Literacy and the codes are AIILOO/AIILO1, and LIS1204 respectively. The study also established that most of the students, including

those who hadn't received formal IL training, believed that they were able to identify, locate, retrieve and use mostly newspapers and books. Some problems faced in the teaching and learning of IL were also highlighted.

The study recommends that:

- The three institutions must harmonize their syllabi on IL, and embed the module or course into the whole university curricula.
- The DUT may consider introducing a dedicated module or course in IL and embed it into students' course materials.
- The three universities need to advertise to academic staff, students and decision makers the importance of having modules or courses in Information Literacy.
- IL should be introduced into various modules/courses; published and presented online in WebCT modules; and delivered in lecture format with the support of tutorials and workshops.
- Academic staff ought to reinforce students' use of indexing and abstracting journals by collaborating in giving the students more work assignments that require the use of these journals.
- The three institutions have to consider buying 'dummy' computers and terminals on which students can practice their computer skills.
- A comprehensive deliberate policy on the teaching of computer skills for one to two months by hired private companies has to be formulated and made compulsory to all students starting from first year.
- The universities' management have to buy more computers and projectors and build more computer laboratories. If they cannot afford to buy them, they should consider leasing the equipment from private companies for one or two years, after which the equipment would be returned.
- A formal agreement between academic staff and library staff could, perhaps, be made. This would entail forming a well structured programme for teaching IL or the Library Orientation programme where subject librarians would be invited [to class] to teach students about the resources available in the library.
- An assessment of students could also be done at the end of the teaching or training sessions; and the marks or grades that are awarded should count towards their end of term or semester continuous assessments.
- In order to stem the time factor, the University of Zululand should revert to the semester system where there would be enough contact between the academic staff and students, who in turn would have enough time to grasp the content.

- At Mzuni, a proper timetable needs to be allocated to enable students in the Department of Library and Information Science to use the ICT laboratory.
- For the teaching of library orientation programmes, library staff must negotiate with the academic departments so that some departments provide, in their curricula, more slots for the teaching of IL or Library Orientation programmes.

References

Allen, L (2000). *Information Literacy in Higher Education: A Revolution in Learning.* (Online): Retrieved May 7, 2007 from http://www.pages.drexel.edu/~la35/Information_Literacy_in_Higher_Educatio n.html.

American Library Association (2007). *Information Literacy competency Standards for Higher Education* (Online): Retrieved on March 20, 2007 from http://www.ala.org/ala/acrlbucket/homepagecontent/contactacrl.htm .

Azmi, H. (n.d). *Teaching Information Literacy Skills. A case study of the QU core programme in Qatar University.* (Online): Retrieved on April15, 2008 from http://www.ics.heacademy.ac.uk/italics/vol5iss4/azmi.pdf.

Baker, K. (2005). *Baker model.* (Online): Retrieved on February 20, 2008 from http:www//virtualinquiry.com/inquiry/bakermodel.pdf.

Barton, H. (n.d.). *Information Literacy: Learning How to Learn.* (Online): Retrieved March 5, 2007, from http://www.ri.net/RITTI_Fellows/Barton/infolit.html.

Bruce, C. (2002). *Information Literacy as a catalyst for educational change: Abackground paper.* A white paper prepared for UNESCO, the U.S. National Cmmission on Libraries and Information Science, and the National Forum on Information Literacy, for use at the Information Literacy meeting for experts, Prague, the Czech Republic. (Online): Retrieved March 25, 2008 from http://www.nclis.gov/libinter/infolitconf&meet/papers/bruce-fullpaper.pdf

Chartered Institute of Library and Information Professionals (2006). *A short introduction to Information Literacy.* (Online): Retrieved March 4,

2007from http://www.cilip.org.uk/professionalguidanceinformationliteracy /definition/introduction. htm.

Council of Australian University Librarians (2001). *Information Literacy Standards.* 1ᵉed. Retrieved March 15, 2007 from http://www.caul.edu.au/caul-doc/InfoLitStandards2001.doc.

De Jager, K. and Nassimbeni, M. (2002). *Can they do and do they? Exploring the Information Literacy tuition in South African tertiary institutions.* A Paper presented at LIASA (2002): Port Elizabeth, South Africa. (Online): Retrieved March 10, 2007 from http://home.imaginet.co.za/liasa/Karin%20&%20Mary2002.rtf.

Eisenberg, M. and Berkowitz, B. (1990). *A Big6 Skills overview.* (Online): Retrieved April 15, 2007 from http://www.big6.com/showarticle.php?id=16.

Kibirige, S.N. (2005). *The current status of Information Literacy training at Monash South Africa* in Kiondo, E and Msuya (eds), J, User Information Literacy: case studies from University Library programmes in the SCANUL-ECS region. Bristol: INASP.

Kituyi-Kwake, A.W. (2007). *The role of Information and Communication Technologies in Harnessing Information for women in rural development: Case studies of South Africa and Kenya.* Ph.D Thesis. University of Zululand.

Kuhlthau, C.C. (1993). Information Search Process. (Online): Retrieved on June10,2007fromhttp://www.Scils.rutgers.edu/~Kuhlthau/Information_Sea rch Pr ocess.htm.

Molepo, C. and Vuren, A. V. (2005). *User education at the Rand Afrikaans Universityin* Kiondo, E and Msuya (eds), *User Information Literacy*: case studies from University Library programmes in the SCANUL- ECS region J.Bristol: INASP.

Mostert, B.J. (2004). Parliamentary Information Sources, Systems and Services in South Africa and the role of parliamentary Libraries and Information provision. Ph.D Thesis. KwaDlangezwa: University of Zululand.
Orr, D., Appleton, M. and Walllin, M. (2001). *Information Literacy and flexible delivery: Creating a conceptual framework and model.* (Online):RetrievedonFebruary 20, 2008fromhttp://www.Sciencedirect.com/

        Science?ob=HomepageURL&method=Homepage&Ig=Y&_acct=C0000 5
25   01&Version=Iuserid= 1378591&mdsurlversion=0&=07da26a475b8d70
     a9536ff9c7f114c.

Pappas, M.L. and Tepe, A.E. (2002). *Pathways to Knowledge and Inquiry Learning*. (Online): Retrieved on March 20, 2007 from http://virtualinquiry.com/inquiry/pathways.htm.

Parker, J. (2003). *Putting the pieces together: Information Literacy at the Open University* (Online): Retrieved May 6, 2007 from

http://www.emeraldinsight.com/Insight/ViewContentServlet?Filename=Pu blished/E meraFullTextArticle/Articles/0150240405.html.

Society of College, National and University Libraries. (1999). *Information Skills in Higher Education: A Sconul Position paper.* (Online): RetrievedMay7,
2007 from http://www.sconul.ac.uk/groups/informationliteracy/papers/Sevenpillars. html.

Skov, A. and Skærbak, H. (2003). *Fighting an uphill battle: teaching Information Literacy in Danish institutions of higher education.* (Online): Retrieved April
20, 2007 from http://www.emeraldinsight.com/Insight/ViewContentServlet?
Filename=Published /EmeraldFullTextArticle/Articles/0350520704.html.

Stripling, B. and Pitts, J. (1988). *Brainstorm and Bluesprints: Teaching Research as a Thinking Process.* (Online): Retrieved from http://Virtualinquiry.com/inquiry/strpling.htm.

Underwood, P. (2002). A case study in Development through Information Literacy. A white paper prepared for UNESCO, the U.S. National Commission on Libraries and Information Science, and the National Forum on Information Literacy, for use at the Information Literacy meeting for experts, Prague, the Czech Republic. (Online): Retrieved March 25, 2008 from
http//www.nclis.gov/libinter/infolitconf&meet/papers/underwood-fullpaper.pdf.

MOODLE versus SAKAI, KEWL.NextGen/Chisimba.
Open source Learning Content Management Systems (LCMS) at South African Universities since 2000.

CJB Le Roux[12] and MM. Spruyt[13]
Department of Library and Information Science
University of Zululand, Richards Bay, KwaZulu-Natal, South Africa.
jleroux@pan.uzulu.ac.za
mspruyt@iafrica.co.za

Abstract

In August 2003, the Department of Education released a lengthy draft White Paper on e-Education in South Africa. In this paper, the government set out its "...response to a new information and communication technology environment in education… for e-learning and the e-administration" of schools. It stated that the government wants to ensure that every school has access to a wide choice of diverse, high-quality communication services and that higher educational institutions would "assist with training and course materials" (Draft White Paper on e-Education, 2003:Foreword).

While commercial e-learning systems such as WEBCT and BLACKBOARD (WEBCT and BLACKBOARD merged in 2006) have been in use at most South African universities since the late 1990s, the deployment of open source e-learning systems has been a relatively recent development associated with the evolution of Web 2.0 technologies. Unlike commercial products, there is currently no preferred OS Learning Course Management System (LCMS) at South African Universities. The three OS LCMS currently in use at South African institutions of higher education are: SAKAI, KEWL.NextGen/Chisimba, and MOODLE.

This paper presents a brief overview of open source e-learning Course Management Systems, also referred to as: Content Management Systems (CMS); Learning Management Systems (LMS) and Learning Course Management systems (LCMS); currently deployed at universities in South Africa as an alternative to commercial systems. In this paper, we will refer to all e-learning content/course management systems as LCMS.

<META HTTP-EQUIV="Keywords" CONTENT="e-learning, CMS, LMS, LCMS, MOODLE, KEWL.NextGen/Chisimba, SAKAI">

1. Introduction

E-learning or Learning Management Systems (LMS), in the open source (OS) domain, have become the new buzz word in academia both

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[12] Jerry Le Roux, PhD, is Associate Professor in the Department of Library and Information Science, University of Zululand, South Africa

[13] MM Syprut is a Lecturer at the University of Zululand.

internationally and locally over the last eight years. It is a development that is closely associated with the development and growth of Web 2.0 technologies. Several of South Africa's leading universities have started to adopt and use OS LCMS in conjunction with their existing commercial e-learning systems, mainly WEBCT and BLACKBOARD. In the Western Cape, the University of Cape Town(UCT) has joined the SAKAI Project, whilst its immediate neighbour, the University of the Western Cape (UWC), adopted a different system known as KEWL.NextGen/Chisimba which forms part of the AVOIR (African Virtual Open Initiatives and Resources) initiative. (www.avoir.uwc.ac.za; www.kewl.uwc.ac.za).

MOODLE, a close competitor of SAKAI, is used by Rhodes University, the Vaal University of Technology, and the Universities of KwaZulu-Natal (UKZN) and Zululand (Unizul). UKZN also has an in-house developed system known as OLS (Open-Learning System) [www.saide.org.za/;www.del.maths.za.net].The University of Zululand adopted MOODLE as is its main LCMS at the beginning of 2008.

SAKAI was developed in the United States through multi-million dollar funding from the Mellon Foundation. Version (v1.0) was released in March 2005. Since then, SAKAI has rapidly expanded its support base among both academic and commercial institutions around the word. Early versions of the software were largely based on the "CHEF" course management system of the University of Michigan (www.SAKAIproject.org; www.tectonic.co.za).

Besides UCT, the universities of the North West (NWU) and South Africa (UNISA) have also adopted SAKAI. Some sources include the University of the Free State, although the SAKAI website makes no reference to the institution (www.SAKAIproject.org). The South African universities using SAKAI have formed an association to provide "mutual and collaborative support". According to Joseph Hardin, the local SAKAI project board chairperson, SAKAI is currently supported by more than 80 educational and 12 commercial institutions world-wide. SAKAI is managed by the SAKAI Foundation, which is controlled by a 10-member board. The foundation is a non-profit organization financed by annual contributions from its members/participating partners. Membership fees range from $5 000 (R40,000) a year for institutions with less than 3000 students, to $10 000 (R80,000) for institutions with more than 3000 students (www.tectonic.co.za; www.sources.SAKAIproject.org).

The rest of the South African higher educational landscape (the universities of Stellenbosch, Fort Hare, Walter Sisulu, Free State, Limpopo, Pretoria, Venda, Witwatersrand, Johannesburg etc.) remain committed to

WEBCT/BLACKBOARD. The Nelson Mandela Metropolitan University uses video conferencing facilities across 7 sites to deliver course content to its students. There is no immediate indication that these institutions are considering moving to an OS LCMS (www.saide.org.za/). The University of the Western Cape (UWC) remains the only institution using the Linux-Apache-PEAR based KEWL.NextGen/Chisimba system.

2. 2003 draft white-paper on e-education

In August 2003, the Department of Education (DOE) released a lengthy draft White Paper on e-education in South Africa. The paper set out the government's "...response to a new information and communication technology environment in education" for e-learning and the e-administration of schools. It states that the government wants to ensure that every school has access to a wide choice of diverse, high-quality communication services, and that it wants all learners and local communities to benefit from this investment (Draft White Paper on e-Education, 2003:Introduction).

Admitting that it will require a "significant investment", the White Paper went on to set a number of goals that the governement wishes to achieve. Under the heading "e-education policy goal" it states that: "Every South African learner in the general and further education and training bands will be ICT capable... by 2013." As to the type and nature of ICT tools to be used, the paper states that: "The Department of Education will determine the basic ICT tools to be supplied to each institution defined as an e-school" (Draft White Paper on e-Education, 2003:par.2.28). While the White Paper makes reference to both open source and proprietary software, it places a great emphasis on accessibility, usability, content compatibility and inter-operability with "...existing software and hardware" which, in the most cases, are Windows-based (Draft White Paper on e-Education, 2003:par.4.6; see also Phase11).

As to which systems or platforms should be deployed for e-learning and training, the document states that: "Government will play an integral role" in bringing together teachers, researchers and the ICT industry through "an action-oriented research and development forum to evaluate and develop leading edge [sic] applications for e-learning" and that these communities "must continuously assess current practices, and explore and experiment with new technologies, methodologies and techniques that are reliable and will support teachers and administrators in e-leaning and e-administration" (Draft White Paper on e-Education,2003:par.4.59-4.60).

3.   Role of higher education in e-learning.

On the role of higher education in the development of e-learning in secondary education systems, the paper states that the Department of Education and the provincial education departments will "collaborate" with the higher education institutions to "design and deliver in-service and pre-service training programs for teachers, managers and administrators". In other words, the DEO "must ensure the inclusion of ICT integration competencies for teachers, administrators, and managers in accredited pre-service teacher training programs delivered by higher education institutions" (Draft White Paper on e-Education, 2003:par.4.22).

Beyond this, the paper has little to say about the role of higher education in the development of e-learning capacity at schools. In terms of connectivity, the paper states that every teacher and learner in the GET and FET bands must have access to an educational network and the Internet by 2013.

At the World Ministerial Seminar on Technology in Education held in London in January 2007, the Minister of Education, Naledi Pandor, announced the roll-out of an educational portal called Thutong (SeTswane for "place of learning") with over 21 000 learning objects. At the same time, she admitted that the majority of South Africa's 26 000 schools and thus the majority of the country's 12 million learners do not have any access to ICT infrastructure, despite the department's plans to provide e-learning to all schools by 2013 (www.polity.org.za/Pandor:09/01/07).

In March 2008, the Thutong portal was re-launched after being made Web 2.0 compliant with the addition of various subject learning spaces that contain "featured bloggers", where, for example, issues such as difficult sections of the syllabus can be discussed. However, given the fact that only 3 in 10 schools have access to any form of ICT infrastructure, the Thutong portal's   current   impact   on   e-education   in   schools   is   limited (www.southafrica.info).

4.   Which open source LCMS?

Since the arrival of Web 2.0 and its associated applications at the beginning of the 21st century, a debate has grown as to which of the many e-learning course management systems available is the best and has the most support internationally. Needless to say, each has their fierce supporters and detractors and views are more often based on loyalty than on useful features or functionality. The three LCMS referred to above have more or less the same functionality and features, including forums, classes, grade-book, chat,

Wikis, personal blogs, groups, lessons, html editor for content, student roster, calendar and custom events, attendance, on-line submissions, quizzes, assignments, surveys, messaging/ email –integration, RSS feeds, student transcripts, task list, alerts, daily events, etc. All three systems are also SCORM 2004 (Sharable Content Object Reference Model) compliant (www.grahamglass.blogs.com).

So what makes one system more popular than the next? This is a difficult question to answer. There are undoubtedly many considerations that play a role in deciding which system to adopt. For one, each system uses different technologies and requires different levels of skills, cost and maintenance. Of the three systems, MOODLE is by far the easiest and quickest to install and configure. SAKAI is Java-based while KEWL.NextGen/Chisimba is Apache-PhP-PEAR based. It uses PEAR as an abstract layer for its database connectivity. MOODLE, on the other hand, is APACHE-PhP–MYSQL based and can run on either a Windows or Linux platform. It does not use PEAR. There are of course many other considerations that play an equally decisive role in choosing an LCMS, such as the cost of installation, maintenance and upgrade; stability; support; and the range of useful and stable features and modules available.

5. SAKAI

SAKAI is a relative newcomer to the OS LCMS arena. Since its release in 2004, SAKAI has very rapidly become an LCMS of choice amongst many of the world's largest universities. Influential IT companies such as IBM, Oracle and Sun Microsystems have committed themselves to SAKAI's development (www.SAKAIproject.org; www.nitle.org).

The SAKAI website contains extensive documentation on all aspects of the project, including its installation on various platforms such as LINUX and Solaris. It recommends MYSQL 5.0 and Oracle 10g for LINUX and Oracle 9i for Solaris installations. The latest release, v2.5.0, comes in three installation types: a demo installation (170MB); a binary installation (163 MB); and a sources installation (25-34MB) [www.SAKAI.org].

There is currently a lively debate going on between the SAKAI and MOODLE communities as to which system is the best, considering in particular the development costs of SAKAI compared to the development costs of MOODLE. Comparisons are made on almost all levels, from the number of lines of code to features, SCORM capabilities, built-in components, etc.

A list of some of the tools and features that a good LCMS should comply with is provided below. SAKAI, MOODLE and KEWL.NextGen/Chisimba all comply favourably with these tools and features (http://www.eduTools.com). The manner in which these three systems display SCORM content can be seen on the eXeLearning website - **eXe** is a popular open source SCORM editing tool (www.exeleearning.org).

Figure 1 List of standard LCMS features.
Communication Tools

1. Discussion
2. Discussion Management Forum
3. File Exchange
4. Internal Email
5. Online Journal/Notes
6. Real-time Chat
7. Whiteboard
8. RSS Feeds

Productivity Tools

1. Bookmarks
2. Calendar/Progress Review
3. Searching Within Course
4. Work Offline/Synchronize
5. Orientation/Help

Student Involvement Tools

1. Group-work
2. Community Networking
3. Student Portfolios

Administration Tools

1. Authentication
2. Course Authorization
3. Registration Integration
4. Hosted Services

Course Delivery Tools

1. Automated Testing Management
2. Automated Testing Support
3. Online Marking Tools

4. Online Grade-book
5. Course Management
6. Student Tracking

Content Development Tools

1. Accessibility Compliance
2. Content Sharing/Reuse(SCORM)
3. Course Templates
4. Customized Look and Feel

Design Tools
Standards Compliance
   Software

1. Client Browser Required
2. Database Requirements

   Hardware

1. UNIX /Linux Server
2. Windows Server

Licensing

1. Commercial
2. Open source

     Being Oracle-based, SAKAI is ideal for institutions that use Oracle-based e-Educational Management Systems such as PeopleSoft or ITS (Integrated Tertiary Software). SAKAI can handle large numbers of users simultaneously. UNISA, for instance, has over a 100 000 students. However, as an OS Java-based system, SAKAI requires considerable skills and expertise to install and maintain, especially on a Windows platform.

6. KEWL.NextGen/Chisimba

     KEWL (Knowledge Environment for Web-based Learning).NextGen/Chisimba is the OS LCMS of choice for the University of the Western Cape (UWC). The system's development is part of the African Virtual Open Initiatives and Resources (AVOIR) project which is a collaborative effort among African higher education institutions to build capacity in open source software engineering.

Like the SAKAI Project, the AVOIR Project is managed by a project board. The board met for the first time in November 2006. Most of its work is done via its website and a mailing list (www.avoir.uwc.ac.za). The project makes use of a student internship program to assist with the development of the LCMS. In 2006, a new features rich framework – Chisimba - was developed, and KEWL3.0/Chisimba was released in 2007. UWC remains the only South African university to use KEWL.NextGen/Chisimba (www.avoir.uwc.ac.za). Technology-wise, it uses the same platform as the popular German-based ILIAS LM system.

7. MOODLE

MOODLE (Modular Object-Orientated Dynamic Learning Environment) is currently deployed by the Universities of Rhodes, KwaZulu-Natal (UKZN) and Zululand. The latter adopted MOODLE at the beginning of 2008. It will coexist with a previous version of WEBCT and an in-house development initiative called IMS. Of the two open source systems referred to above, MOODLE is not only completely free but also the easiest and quickest system to install.

MOODLE was designed by Martin Dougiamas at Curtin University, Australia, in the late 90s after he became frustrated with the limitations of WEBCT (Cole and Foster, 2007; www.MOODLE.org). MOODLE currently has an international user-base of more than 36,0000 registered sites in more than 130 countries, amounting to more than 14 million users and covering 70 languages (www.MOODLE.org).

An independent survey of 50 universities by the University of Oviedo's Computer Science Department in March 2008 of web-based LCMS found that compared to SAKAI (10.91%), WEBCT/BLACKBOARD (27.27%), dotLRN and other self-developed systems (16.36%), MOODLE has the largest international footprint (34.55%) (www.di.uniovi.es) [See graph below].

Figure 1: Chart showing SAKAI, dotLRN, MOODLE, WEBCT/BLACKBOARD's international footprint.
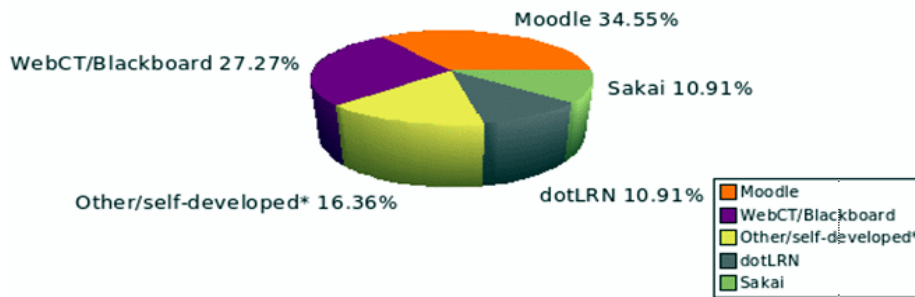
Unlike other systems, MOODLE was developed around the core pedagogic principle of "social constructionism". This represented a novel approach, since most LCMS were built around tool sets, not pedagogy. MOODLE therefore, is "learning-centered", while other systems are "tool-centered". According to the authors of the popular MOODLE book, *Using MOODLE*, social constructionism is based on the principle that people learn and construct knowledge by engaging with one another in social processes. The term "social process" therefore indicates that learning is something that occurs when people interact with one another in social groups. In such processes, new knowledge is tested against existing or established beliefs and incorporated into existing or new knowledge structures. Unlike tool-centric learning systems, MOODLE has its tools built into its interface, which makes the "learning task" central to its use (Cole & Foster, 2007:2-5; Rice, 2006: Introduction; Smith, 2005:1-2).

Although development started in the late 90s, the first version of MOODLE was only released in 2002. Since then, the system has quickly grown in popularity to reach the dominant position in OS e-learning it holds today. The current version - MOODLE 1.9 - contains some major improvements and additions over previous editions. Several modules, such as the grade-book, have been redesigned or upgraded. Below is a list of the changes made in MOODLE 1.9. These will be further enhanced and updated in MOODLE v2.0 which is scheduled for release at the end of 2008 (www.MOODLE.org).

- An outcomes (competencies) module. This brings MOODLE on par with ILIAS, which until the release of MOODLE version 1.9, was the only LCMS that contained a competency profile module (Aberdour, 2007:15-18; www.epic.co.uk)

- An improved "events API", which allows for code to "hook" into events in a cleaner way. In version 1.9, the developer can more easily "hook" into MOODLE events such as adding a user.

- Improvements in scalability and performance. MOODLE 1.9's code represents an extensive overhaul to increase performance and scalability. It now loads much quicker on sites with thousands of courses and users.

- Integration with Mahara E-portfolio. Mahara E-portfolio (New Zealand) is an open source e-portfolio, weblog, resume builder, and social networking system that connects users and creates online learning communities. In addition to the existing exabis-e-portfolio module, users can now also configure MOODLE to work with Mahara (www.eduforge.org).

- Tags. Users can now describe their own interests in terms of tags which create interest pages around them, thereby bringing information together from a variety of sources (Blogs, Flickr, Youtube, etc).

- An improved question bank. This allows questions to either be shared with the whole site or kept private to a single module or course.

- Notes. Detailed notes can now be kept about individual users.
- Bulk user actions. Administrators can perform bulk user actions, such as the mass deletion of user accounts or the bulk upload of users and user fields based on templates.

- A new custom corners theme has been added.
- KSES related XSS security vulnerabilities have been fixed.
- New theme settings have been introduced.
- Improved groups and groupings. Activities and resources can now be assigned to particular groupings.

- Improved support for Oracle database connectivity.
- Ability to control or block visibility with roles (www.docs.MOODLE.org).

The remainder of this paper deals with the installation of MOODLE on a Windows platform using a WAMP (WINDOWS-APACHE-MYSQL-PHP) platform. Although any modern version of Windows will do, Windows 2003 or 2008 are best because of their stability. Both come with a robust web-server in the form of Internet Information Services (IIS) 6/7. This paper opts to show how to install and run MOODLE on the Windows 2003 Server using the latest version of Apache (v.2.2.5).

8. MOODLE on a WAMP (WINDOWS-APACHE-MYSQL-PHP) installation.

The following software packages are needed to install MOODLE on a WAMP platform. The latest versions available for download are shown below.

- Notepad2.exe(WIN) (247 KB) (www.sourceforge.net)

- APACHE _2.2.8-win-x86-no_ssl.msi.exe (4278 KB) (www.apache.org)

- MySQL_Server_ 5.0.2_Setup.exe (42,459 KB) (www.mysql.com)

- PhP_5.2.5-Win32.zip (9,713 KB) (www.php.net)

- PhPMyAdmin_ 2.11.1-english.zip (1,811 KB) (www.phpmyadmin.net)

- MOODLE 1.9 zip (13,653 KB) (www.MOODLE.org)

9. Installing Notepad2.

Notepad2 is a free editing tool that has many advanced functions such as the ability to show the numbers for lines of code. It can be downloaded from the www.sourceforge.net website and extracted and installed to a directory of choice. The Windows registry is updated via the Notepad2.reg file.

10. Installing MySQL database server.

The default installation path for the MySQL database server is C:/program file/mysql. However, for easier access the server could be custom installed to a user-specified directory on C:, e.g. C:/mysql5. To install MySQL to this directory, start the installer and select Custom. Next, select Change and enter the new mysql5 installation path. Click next to install the server. Once the installation is complete, the Server Instance Configuration wizard will load. MySQL offers three installation types: a Developer Machine, a Server Machine and a Dedicated MySQL Machine. The first is mainly for development work and testing, the second is for web and application servers, and the third is for dedicated database servers. The installation described here is based on the Server Machine. The default port for TCP/IP networking is 3306 and should be left unaltered. Strict mode and Include Bin Directory in Windows PATH should be enabled. Finally, a password for the server root-user should be set. For a production environment, the username should be changed from "root" to something more secure. This can be done through the PhPMyAdmin database tool [See section 14].

11. Installing PHP as a module.

To install PhP as a module, create a new root directory, e.g. C:/php5, and extract the PhP_*5.2.5-Win32.zip* file to it. Next, open the php.ini.recommended file in Notepad2 and re-save it as php.ini.

The php.ini configuration file is crucial for the successful installation of MOODLE, and Windows needs to be informed where to find it. This is done by adding it to the Windows PATH. Right click My Computer and select Properties > Advance > Environmental Variables. Select User Variable > New and add PHPRC under the Variable Name and C:\php5\php.ini under the Variable Value. Restart Windows to update the registry. Next, the php.ini file needs to be modified, as shown in Section 11.1 below.

Modifying the php.ini file.

Open php.ini in Notepad 2 and make the following changes to it:

Change lines:

Add lines: **Line 393:**   max_execution_time =250 (in seconds)
                 upload_max_filesize = 100M

          Line 481-   doc_root =C:\apache2\htdocs\

          Line 488-   extension_dir = "C:\php5\ext\"

Uncomment the following extensions: (Lines 642- 686)

41

extension=php_bz2.dll

extension=php_curl.dll

extension=php_gd2.dll

extension=php_dba.dll

extension=php_dbase.dll

extension=php_gettext.dll

extension=php_gmp.dll

extension=php_imap.dll

extension=php_mbstring.dll

extension=php_mcrypt.dll

extension=php_mysql.dll

extension=php_mysqli.dll

extension=php_openssl.dll

extension=php_xmlrpc.dll

extension=php_zip.dll

Add line:

Line 993 -   session.save_path = "C:/php5/tmp"

12. Installing and configuring Apache_ 2.2.8.

Apache installs by default to C:/Program Files/Apache Group. For easier access Apache, like MySQL, should be installed to its own directory on the C: drive, e.g. C:/apache2. Apache is installed as a Windows service on port 80 or port 8080. The default server port is 80. Installation is done via a wizard. To install Apache to the C:/apache2 directory, select Custom > Change and set the installation path to C:/apache2/. Complete the installation.

Configuring the Apache httpd.conf file

Next, Apache needs to be informed as to where the PhP installation is.
Select Start > Programs > APACHE HTTP Server2.2 > Configure Apache
Server > Edit the Apache httpd.conf configuration file and edit the file in
Notepad2 as follows:

Line 59: (the domain name or IP-Address that the server will run on).
   Listen 127.0.0.1:80
Lines 74 -144: (uncomment)
   LoadModule actions_module modules/mod_actions.so
   LoadModule alias_module modules/mod_alias.so
   LoadModule asis_module modules/mod_asis.so
   LoadModule auth_basic_module modules/mod_auth_basic.so
   LoadModule authn_default_module modules/mod_authn_default.so
   LoadModule authn_file_module modules/mod_authn_file.so
   LoadModule authz_default_module modules/mod_authz_default.so
   LoadModule authz_groupfile_module modules/mod_authz_groupfile.so
   LoadModule authz_host_module modules/mod_authz_host.so
   LoadModule authz_user_module modules/mod_authz_user.so
   LoadModule autoindex_module modules/mod_autoindex.so
   LoadModule cache_module modules/mod_cache.so
   LoadModule cgi_module modules/mod_cgi.so
   LoadModule dir_module modules/mod_dir.so
   LoadModule env_module modules/mod_env.so
   LoadModule include_module modules/mod_include.so
   LoadModule isapi_module modules/mod_isapi.so
   LoadModule log_config_module modules/mod_log_config.so
   LoadModule mime_module modules/mod_mime.so
   LoadModule negotiation_module modules/mod_negotiation.so
   LoadModule proxy_module modules/mod_proxy.so
   LoadModule proxy_ajp_module modules/mod_proxy_ajp.so
   LoadModule proxy_balancer_module modules/mod_proxy_balancer.so
   LoadModule proxy_connect_module modules/mod_proxy_connect.so
   LoadModule proxy_ftp_module modules/mod_proxy_ftp.so
   LoadModule proxy_http_module modules/mod_proxy_http.so
   LoadModule rewrite_module modules/mod_rewrite.so
   LoadModule setenvif_module modules/mod_setenvif.so
   LoadModule speling_module modules/mod_speling.so
   LoadModule userdir_module modules/mod_userdir.so

Line 144: (add)
LoadModule php5_module "C:/php5/php5apache2_2.dll"
Line 248 (change)

43

DirectoryIndex index.html index.htm index.php
Line 25:1 (add)
   PHPIniDir "C:/php5/"(the path must have a trailing slash)
Line 389: (change)
   AddType application/x-httpd-php .php .html .htm.

Save the changes. Go to Start > Programs > Apache HTTP Server2.2 > Configure Apache Server and select Test Configuration. The utility should run without any error messages. Next, restart Windows to ensure that all extensions, particularly the database extensions, are correctly loaded.

13. Testing the WAMP installation.

The WAMP installation is tested via a short PhP script such as the one shown below. Create a folder under the Apache webroot at htdocs and name it phptest. Open Notepad2 and enter the code shown below. Save the file as index.php under the phptest folder.

```
<?php
Echo '<div><PRE style="text-align:center">This PCs IP_Address is: ' . ;
$_SERVER['REMOTE_ADDR']  . '</PRE></div>' ;
Echo '<p style="text-align:center">This is IIS on Port: ' . ;
$_SERVER['SERVER_PORT']  . '</p>' ;
Echo '<hr/>' ;
phpinfo();
?>
```

Next, open any web-browser (IE or FireFox) and enter the web-path to the phptest folder e.g. http://localhost/phptest/ to load the index.php file. If the installation was successful, the following information will load.

Figure 2: index.php page

44

This PCs IP_Address is:127.0.0.1 on Port:80

PHP Version 5.2.5

System	Windows NT LAPTOP 5.2 build 3790
Build Date	Nov 8 2007 23:18:08
Configure Command	cscript /nologo configure.js "--enable-snapshot-build" "--with-gd=shared"
Server API	Apache 2.0 Handler
Virtual Directory Support	enabled
Configuration File (php.ini) Path	C:\WINDOWS
Loaded Configuration File	C:\php5\php.ini
PHP API	20041225
PHP Extension	20060613
Zend Extension	220060519
Debug Build	no
Thread Safety	enabled
Zend Memory Manager	enabled
IPv6 Support	enabled
Registered PHP Streams	php, file, data, http, ftp, compress.zlib, compress.bzip2, https, ftps, zip
Registered Stream Socket Transports	tcp, udp, ssl, sslv3, sslv2, tls
Registered Stream Filters	convert.iconv.*, string.rot13, string.toupper, string.tolower, string.strip_tags, convert.*, consumed, zlib.*, bzip2.*

This program makes use of the Zend Scripting Language Engine: Powered By

mysql

MySQL Support	enabled
Active Persistent Links	0
Active Links	0
Client API version	5.0.45

Directive	Local Value	Master Value
mysql.allow_persistent	On	On
mysql.connect_timeout	60	60
mysql.default_host	no value	no value
mysql.default_password	no value	no value
mysql.default_port	no value	no value
mysql.default_socket	no value	no value
mysql.default_user	no value	no value
mysql.max_links	Unlimited	Unlimited
mysql.max_persistent	Unlimited	Unlimited
mysql.trace_mode	Off	Off

mysqli

Mysqli Support	enabled
Client API library version	5.0.45
Client API header version	5.0.45
MYSQLI_SOCKET	/tmp/mysql.sock

45

The mysql and mysqli database extensions must load as shown above for the installation to be successful. PHP/MySQL database based systems such as PhPMyAdmin and MOODLE cannot be installed without these extensions.

14. Installing the PhPMyAdmin database admin tool.

MySQL database administration can be done via the command-line or via web-based tools such as PhPMyAdmin. PhPMyAdmin is installed to a web folder under the Apache webroot e.g. htdocs/databaseadmin or htdoc/dbadmin. Extract the PhPMyAdmin_ *2.11.1-english.zip* file to this folder and set the Windows security for the folder to read and write. To do this, right click the folder and select the Sharing and Security > Security tabs and add the account that will be responsible for maintaining the database. Administrators have full access.

To setup PhPMyAdmin, open a browser and enter the http: path to the PHPMyAdmin installation, e.g.   http://localhost/dbadmin. Alternatively, PhPMyAdmin can be manually set up via the config.sample.inc.php configuration file (Delisle, 2006:33-35). The second method is, however, the quickest way. Open the config.sample.inc.php file in Notepad2 and make the changes indicated below. Resave the file as config.inc.php. The changes below should reflect the changes made to the MySQL database during its installation.

```
   Lines 17- 38
$cfg['blowfish_secret'] = 'SDEFR34RRD23'; /*The blowfish_secret is an alpha-
numeric value  needed for COOKIE authentication */
/*
* Servers configuration
*/
$i = 0;
/*
* First server
*/
$i++;
/* Authentication type */
$cfg['Servers'][$i]['auth_type'] = 'cookie';
/* Server parameters */
$cfg['Servers'][$i]['host'] = 'localhost';
$cfg['Servers'][$i]['connect_type'] = 'tcp';
$cfg['Servers'][$i]['compress'] = True;
```

```
/* Select mysqli if your server has it */
$cfg['Servers'][$i]['extension'] = 'mysqli';
/* User for advanced features */
$cfg['Servers'][$i]['controluser'] = 'root';
$cfg['Servers'][$i]['controlpass'] = 'root';
```
(Delisle, 2006:33-35).

Once the necessary changes and the security settings for the PhPMyAdmin folder have been made, the PhPMyAdmin login page can be accessed via a web browser by entering the web path to the PhPMyAdmin web folder, e.g. http://localhost/dbadmin. Once logged in, a database for MOODLE can be created.

15. Installing MOODLE v1.9

MOODLE, like PhPMyAdmin, is extracted and installed to its own directory under the Apache htdocs webroot [See below].
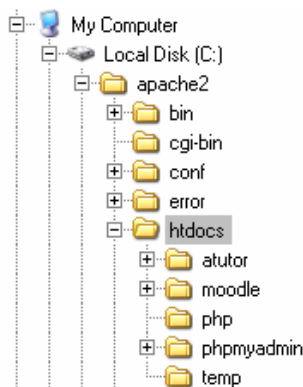
If the WAMP installation has been correctly setup, MOODLE will largely install itself. Open a web browser and enter the web-path to the installation, e.g. http://localhost/MOODLE/, and follow the instructions. MOODLE checks the php.ini file for the correct setting before generating a config.php configuration file that it uses for the installation. Select unattended installation to allow MOODLE to auto install itself. Once the installation is complete and the main administrator account created, the new admin user is automatically logged into the MOODLE site.

16. Conclusion

E-learning and Learning Management Systems (LMS) are not a new concept and are not peculiar to the 21st century. Commercial systems such as

WEBCT and BLACKBOARD were developed during the 90's. These systems enjoyed considerable market dominance until the arrival of the open source (OS) systems. Unlike the commercial systems, the OS LCMS are largely 21st century developments. The term e-learning was only coined towards the end of the 90s. (Cross, 2004: www.Internettime.com). To what extent the rapid growth and popularity of these OS e-learning systems threatened the market share of WEBCT/BLACKBOARD is not clear; however, in 2006 BLACKBOARD felt it necessary to apply for a US patent for "Internet-based education support systems and methods" (US Patent:6988138) [www.patft.uspto.gov]. BLACKBOARD also filed a lawsuit against Desire2Learn, a competing educational software developer, claiming infringement of its e-Learning patent. The lawsuit was immediately opposed by Desire2Learn, while the Software Freedom Law Centre (SFLC) requested a re-examination of the patent application on behalf of the SAKAI Foundation, the MOODLE and ATutor Communities, and the rest of the international OS software community. The application was successful, and in March 2008, the United States Patent and Trademark Office (USPTO) rejected all 44 of BLACKBOARD's US patent claims as invalid (SAKAI Newsletter May 1,2008; www.SAKAIproject.org; www.softwarefreedom.org).

The rejection of BLACKBOARD's application represents good news for the future development and adoption of OS e-learning systems by institutions of higher education. LCMS such as SAKAI, MOODLE, Kwel.NextGen/Chisimba and others like ATutor, ILIAS and dotLRN will continue to attract support from their supporters. The perception that open-source or free software is inferior to commercial systems no longer holds. SAKAI, KEWL and MOODLE are all capable systems with an active support base both nationally and internationally. One simply has to Google "SAKAI versus MOODLE" or "MOODLE versus SAKAI" to appreciate the support and extent of debate that these two systems alone have engendered since the birth of SAKAI in 2004/5. In South Africa, only time will tell which system will dominate in the higher education landscape. Indications are that it will not be a case of one system fits all. Cost, expertise and undoubtedly some healthy bias, will all play a role in any decision to adopt one system over the other.

References

Aberdour, M. [2007]. Open Source e-Learning Management Systems.
        [Online]. Available WWW: http://www.epic.co.uk(Accessed April
2008).
Adkins, S.S. [2005]. Wake-Up call: Open Source LMS [Online]. Available
        WWW: http://learncircuits.org/2005 (Accessed April 2008).

Alexa. The Web Information Company. [Online]. Available WWW:
http://alexa.com (Accessed May 2008).

Alvarez, V.M. e-learning survey. [Online]. Available WWW:
http://www.di.uniovi.es (Accessed April 2008).

Attwell, G.[28-June-2005]. MOODLE and SAKAI-Open Sources
Alternatives? The Wales-Wide Web.[Online]. Available WWW:
http://www.knownet.com (Accessed May 2008).

BLACKBOARD 138 Patent Re-examination. [2008] SAKAI Newsletter,
May 2008. [Online]. Available WWW: http://SAKAIproject.org
(Accessed 20 may 2008).

Chisimba. Introduction to Chisimba.[n.d]. [Online]. Available WWW:
http://avoir.uwc.ac.za (Accessed April 2008)

Clark, D. [2006]. Reusable Learning Objects: Content and Context. [Online].
Available WWW: http://www.epic.co.uk (Accessed April 2008).

Clark, D. [2006]. Pedagogy and e-Learning. [Online]. Available WWW:
http://www.epic.co.uk (Accessed April 2008).

Cole, J., Foster, H. [2007]. Using MOODLE. 2nd Edition. O' REILLY (also in
PDF version).

Cross, J. [2004]. A History of e-Learning, Berkley California. [Online].
Available WWW: www.Internettime.com/Learning/articles/OTH.doc
(Accessed   March 2008).

Delisle, M. [2006]. Mastering PhPMyAdmin 2.8 for Effective MySQL
Management. 3rd Edition. PACKT Publishers.

Rice, W.H. [2006]. MOODLE. E-Learning Course Development. PACKT
Publishers

Draft White Paper on e-Education, DOE [2003]. [Online]. Available WWW:
http://www.gov.za (Accessed March 2008).

E-Learning @UWC. Kewl.Next Generation (KNG) [n.d]. [Online]. Available
WWW: http://kwel.uwc.ac.za (Accessed January 2008).

eXe, The eLearning XHTML editor.[2008]. [Online]. WWW:
http://www.wikieducator.org (Accessed March 2008).

Free and Open Source Software Portal. A gateway to resources related to
Free Software and Open Source Technology movement. [2008].
[Online]. Available WWW: http://www.unesco.org (Accessed May
2008).

Glass, G.[2008]. Code stats: Edu 2.0,MOODLE, SAKAI. [Online].
Available WWW: http://www.grahamglass.blogs.com (Accessed
March   2008).

Government embraces open source.[26 February 2007]. [Online].
Available WWW: http://www.oss.gov.za (Accessed May 2008).
Higher-ed LMS market penetration: MOODLE vs.

BLACKBOARD+WEBCT vs. SAKAI:[2006]. [Online]. WWW:
http://www.zacker.org (Accessed March 2008).

History of virtual learning environments [2006]. [Online]. Available
WWW:
http://en.wikipedia.org/wiki/History_of_virtual_learning_environments
(Accessed May 2008).

Smith, D. [2005] Using Your MOODLE. [Online]. Available WWW:
http://www.docs.MOODLE.com (Accessed May 2008).

Marcais, T., Riordan, M. [n.d]. MOODLE, An electronic classroom.
Documentation for MOODLE version 1.8 [Online]. Available
WWW: http://www.docs.MOODLE.com (Accessed May 2008).

MOODLE Tutorial. SiteGround Tutorials. [n.d] [Online]. Available WWW:
http://www.siteground.com (Accessed May 2008).

Nagel, D. USPTO Rejects BLACKBOARD Patent Claims(Update10) [Online].
Available WWW: http://www.thejournal.com/articles/22340 (Accessed
April 2008)

Pandor: E-learning in South Africa. [2007]. [Online] Available WWW::
http://www.polity.org.za/Pandor:09/01/07 (Accessed April 2008).
Patent Office Asked to Review and Revoke BLACKBOARD Patent.
Software Freedom law Center. [November 2006]. [Online].
Available WWW: http://www.softwarefreedom.org (Accessed May
2008).

Susaria, S. Standards in e-Learning: Why do we need them? [April 2006].
[Online] Available WWW: http://idt.memphis.edu (Accessed April
2008).United States Patent: 6988138.Internet-based education
support system and methods. [Online]. WWW:
http://patft.uspto.gov (Accessed May 2008).

An Analysis of the Job Market in Library and Information Science in South Africa: A Literature Review

Nicky Mduna[14], nicky1@starmail.co.za
Department of Library and Information Science,
University of Zululand, South Africa

1. Introduction

This paper reviews literature on the Library and Information Science (LIS) job market in South Africa. The paper's objectives are to discuss current LIS employers; job titles offered in LIS; qualifications and requirements for LIS jobs, including knowledge, skills, attitudes and experiences; the remuneration of LIS jobs; and growth opportunities for the LIS job market in South Africa.

2. Current status and challenges of the LIS job market

According to Missingham (2006:n.p), current and future LIS professionals need to be trained to ensure that they can perform effectively in a highly complex and changing environment. Thus, in order for LIS professionals to play an active role in the information society, the education system that caters for professionals in the work environment should be able to provide sufficient knowledge, skills and experiences (Thapisa, 1999; Andrews and Ellis, 2005).

For employers, there are quite specific challenges that come with retaining and developing staff, recruiting skilled staff, and/or developing employment opportunities for those new to the profession. Other challenges facing LIS include the employability of LIS graduates, low payment of employees, lack of recognition for the profession, and other graduates' perception that LIS is somehow unattractive.

Ocholla (2007) is of the view that libraries alone are unable to provide enough job opportunities for LIS graduates. In his view, hardly any new libraries are being built, those existing are unable to offer enough employment or proper salaries due to a lack funds, there is a shortage of

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[14] Nicky Maduna is an Honours Bachelor of Information Science student from the Department of Library and Information Science at the University of Zululand. This paper was presented at the 9th DLIS Annual Conference on the 5-6th September at the University of Zululand.

appropriate posts/vacancies to accommodate college/university graduates; and library management structures do not prioritize libraries for further development. He explains that libraries are also facing stiff competition from emerging information provision centers and services, particularly technology driven services such as the Internet and wireless technology, whose proximity to information seekers and relevance of content is increasingly rendering library services irrelevant to most people. Most of the developments that are discouraging in the LIS job market are occurring in libraries.

As a result, Ocholla (2007) observes that some LIS schools have closed librarianship programmes completely, while others have changed the names of their departments. In the past, most departments were simply called Departments of Library Science/Library Studies or Librarianship. In the eighties, a lot of departments changed their names to the Department of Library and Information Science/Studies. The 90's again saw departments change their names to Information Science/Studies. These changes all reflect a shifting information landscape, mirroring changes in the focus areas of the departments (Ocholla & Bothma, 2007).

A lot of LIS schools have also diversified their qualification programmes by providing additional qualifications in related information areas such as knowledge management, multimedia, records management, publishing, information technology etc.; whilst others have enriched their curricula by adding market-oriented courses and/or academic subjects. Many LIS schools no longer target libraries alone, but aim for a broader information or emerging market because they see that graduates are less interested in librarianship and more focused on other related jobs like records management, publishing, multimedia, networking, web programming etc. There has been a decline in the LIS job market for librarianship qualifications, caused by limited job opportunities in libraries as the expansion of libraries in South Africa is either minimal, or in some cases, non-existent. Proper planning and the funding of public libraries is a major obstacle. The rapid roll out of public libraries in South Africa after the 1994 democratic dispensation has since slowed down and affected not only library services and information access, but also the market for LIS graduates (Ocholla, 2007). Soo-Guan Khoo (2005) notes that information professionals also face competition from several quarters. Competition comes from other types of professionals, e.g. IT professionals and business graduates, and from outside vendors who may outsource the jobs. Information professionals also face competition from new technologies and information products that may displace them.

Still, Ocholla (2005) notes that LIS jobs can be found in many organizations, including central government; local government; parastatals;

NGO's; and international, foreign, private or profit making organizations. According to Mach (2003), there are numerous job titles in LIS, such as: librarian, information officer, desktop publisher, information manager or broker, web designer, PC hardware and/or software technician, web programmer, network technician, information officer, video and sound editor, multimedia designer, communication officer, researcher, knowledge manager, records manager, communication manager, and lecturer in information science upon completion of a post graduate degree. In essence, there are therefore a number of organizations and job titles that can accommodate an LIS graduate.

3. Qualifications needed for LIS jobs

The qualifications needed for LIS jobs vary from country to country and region to region. There are those who emphasize postgraduate qualifications for LIS professionals, such as institutions in North America (Mexico, the USA and Canada). Other countries and regions largely accept both the Postgraduate and Undergraduate LIS qualifications for professional status. As far as South Africa is concerned, the type of training and education needed to qualify for an LIS job (See LIASA 2006, Ocholla and Bothma 2007) can be a four year university degree in Library and Information Science (B Bibl; B Inf.), or a three-year general university degree followed by a one-year post-graduate diploma in Librarianship and Information Science (AUDIS). Alternatively, a four-year technikon degree in Library and Information Studies (B Tech), which consists of a three year National Diploma in Library and Information Studies plus one additional year of study, may be attained. The B Bibl, B Inf. and AUDIS allow further study for the award of Honours, Masters and Doctorate degrees in Library and Information Science. With a B Tech degree, a student can study further towards Masters and Doctoral degrees in Library and Information Studies. These qualifications are mostly for individuals seeking to become librarians. Some universities or technikons offer qualifications differently. For example, there is B.A, B.Tech, BIS, and B.Inf. LIS education, which offer management, information seeking and retrieval, knowledge organization, knowledge representation, and user studies, with an increased integration of technology.

Ocholla and Bothma (2007:3) explain that the undergraduate model is the most common model used in South Africa, consisting of three to four years of study, during which topics from the broad field of LIS are combined with a number of compulsory and/or elective courses from other disciplines. This may then be followed by an Honours degree (one year), during which students specialize in topics dealing with LIS. In the post-graduate model, students are expected to obtain any general degree as an admission requirement to the post-graduate diploma in library and information science. The post-graduate diploma is then followed by a Masters degree. LIS

curricula also increasingly provide core courses or electives/auxiliaries in knowledge management, multimedia, publishing, records management, and information and communication technologies (Aina and Gupta and Gupta in Ocholla & Bothma, 2007:3).

According to Afolabi (1994) the qualifications and skills required for each LIS job tend to vary. For existing information-related jobs, the minimum qualification is a Bachelor of Library Science degree, although the possession of a higher degree in LIS is an advantage and necessary for specialization. He further states that areas such as indexing, abstracting, and editing and bookshop management would require the professional to have taken relevant courses in those areas. Furthermore, subject knowledge may be particularly important in areas such as indexing and editing. Higher degrees in library and information science are essential for teaching the subject, particularly at university level, although a first degree holder in the subject can teach it at a lower educational level (Afolabi, 1994).

4. List of LIS schools in South Africa

According to Ocholla and Bothma (2007), the LIS schools in South Africa are as follows:

- Durban University of Technology, Department of Information Studies
- University of Stellenbosch, Department of Information and Knowledge Management
- University of Cape Town, Department of Information and Library Studies
- University of Fort Hare, Department of Library and Information Science
- University of Johannesburg, Department of Information and Knowledge Management
- University of KwaZulu-Natal, Information Studies Programme
- University of Limpopo, Department of Information Science
- University of Pretoria, Department of Information Science
- University of South Africa, Department of Information Science
- University of the Western Cape, Department of Library and Information Science
- University of Zululand, Department of Library and Information Science
- Walter Sisulu University of Technology, Department of Library and Information Studies

5. Requirements of LIS jobs

According to Griffiths (2000), job requirements are taken to mean the knowledge, skills and attitudes related to effective behavior and work performance. Griffiths states that knowledge refers to information about an area or topic, or knowing or understanding something; a skill is the ability to apply knowledge effectively; and attitude refers to the individual's mental or emotional approach to a situation. One can distinguish between professional competencies related to the library and information science field and personal competencies, i.e. generic skills, attitudes and values (Griffiths, 2000). There are a number of important skills that are needed in LIS that must be taken into consideration (see Soo-Guan Khoo, 2005) as follows:

- Traditional skills in librarianship, including cataloguing, acquisitions, referencing and information seeking and retrieval. Traditional skills are still in demand, but they have to be expanded to handle new digital formats and the online environment (especially the Internet). For example, cataloging now includes the use of new metadata schemes and the cataloguing of digital and Internet resources. Cataloguers are therefore now required to use electronic and online tools.
- Value-adding skills, such as research skills and skills in synthesizing and packaging information to support clients' work and decision-making.
- IT skills, which involve the Internet, Web and XML technologies, RFID, federated search engines, programming and scripting, Windows Operating Systems, and productivity tools (e.g. word processing, spreadsheets, databases, planning tools, etc).
- Transferable soft skills that are generic and cut across disciplines, particularly skills in communication, management, leadership, teaching and training, and teamwork, as well as the ability to empathize with users and understand their information needs.
- Appropriate attitudes, values and personal traits, such as user orientation and service orientation, flexibility and willingness to handle a wide range of tasks, adaptability and ability to handle change, continuous learning, and an entrepreneurial attitude.
- Domain knowledge (subject knowledge) that is specific to the type of information service or organization that an information professional is working in.
- Transferable/generic skills that can be applied to the library environment, including communication, public speaking, writing, public relations, interpersonal/group skills, networking, research skills, interviewing and listening skills, hosting or managing focus groups, analytical skills, teamwork, multi-tasking, and time management.
- Teaching, training and coaching, including skills for providing user education and training in an e-learning environment, developing e-

learning and computer-based learning materials, and facilitating collaborative learning.

- Management and leadership, which includes planning, financial management, budgeting, project management, negotiation and persuasion, supervisory skills, performance management/evaluation, administrative skills, human resources, outsourcing, quality management, the ability to motivate subordinates and lead groups effectively, and strategic planning.

6. Remuneration of LIS jobs

The library and information professions are not well paid in most countries. According to ALA (2005), the salaries for each category should offer a range of promotional steps sufficient to permit a career-in-rank. It is noted by ALA that systems of remuneration are diverse and differ from organization to organization and by levels of appointment. However, the top salary in any category should overlap the beginning salary in the next higher category in order to acknowledge the value of the experience and knowledge gained on the job. For example, a librarian cannot earn the same salary as an assistant librarian because a librarian has got higher qualifications and more experience and skills than the assistant librarian. According to Ocholla's (2005:7) findings, remuneration for LIS jobs in South Africa can range from R 40 000 p.a. to R 600 000 p.a.

7. Opportunities for the future LIS job market in South Africa

Although libraries are reported to be the biggest employers of LIS graduates in Africa, increasing career opportunities in the emerging LIS markets have been noted. Studies by Ocholla (2000, 2005) and Snyman (2000) focusing on career opportunities in South Africa found that other than career opportunities in libraries (which are the largest employer of LIS graduates in South Africa), there were rapidly growing career opportunities in the non-library sector or the emerging market. Graduates from broad LIS programmes can work in any information-related field. As mentioned before, there are many job opportunities/titles that are available to LIS graduates. According to LIASA (2006), the LIS opportunities may lie in different environments, such as in public libraries, which aim to meet the educational, recreational and information needs of local communities; in school media centres, which cater for the pupils' information needs and provide the schools teaching materials; in university, university of technology and college libraries, which meet the study needs of students and the teaching and research needs of the academic staff; in special libraries and information services, which provide an in-depth and personal service to specialist groups of users within research or financial institutions, industry, professional practices or cultural bodies; in national libraries, which are responsible for building, preserving and providing access to a complete collection of material

published in and relating to a specific country; and in allied fields where library training and skills, such as freelancing and lecturing, are relevant.

In all the above, LIS professionals can play a pivotal role by collecting, organizing, processing, analyzing and disseminating development information, and by teaching users to make efficient use of information.

According Ocholla (2007), the emerging market has forced most LIS schools to re-orient their curricula to meet the needs of the new market in order to survive. In his view, experience has shown that educating and providing LIS graduates with more knowledge and skills in broader information disciplines is realistic, viable and rewarding. Thus, he acknowledges, graduates from broad LIS programmes can work in any information-related field. However, the LIS curriculum must include core LIS subjects/courses/modules such as information and knowledge management, information storage/seeking and retrieval, knowledge organization, knowledge representation, and ICT use. Librarians and information professionals face a future that is both challenging and exciting. Their work environment is becoming increasingly complex, with constant changes in their surrounding technological and information environment. In their professional work, they have to keep up with new technologies and systems; new forms of information, information media and information sources; and new tasks and roles (Soo-Guan Khoo, 2005).

8. Conclusion

A number of new job titles have emerged from the broad spectrum of information services or the emerging market. Libraries are facing stiff competition from emerging information provision centres and services, particularly technology driven services such as the Internet and wireless technology, whose proximity to information seekers and relevance of content is increasingly rendering library services irrelevant to most people. There are hardly any new libraries being built. The changes being made in libraries and information departments have affected the LIS job market, reflecting a shifting information landscape. The qualifications and skills required for LIS jobs vary. For example, some jobs require LIS workers to have communication skills, while others require computer skills. There are lots of opportunities for LIS graduates to work and hold a variety of job titles. The remuneration for LIS jobs differs and goes according to the job title, qualification(s) (bachelor's degree master's, other skills and experiences etc.) that a person has obtained. It has been noted in South Africa that the remuneration of LIS workers does not differ much from those of other workers with a similar qualification status. Solutions need to be found to overcome all the challenges faced by the LIS market.

Recommendations
- The LIS job market must develop employment opportunities to retain those who are new to the profession.
- The LIS job market needs to advertise the LIS profession in a way that will attract students and other people to register for LIS studies.
- Governments and the Departments of Library and Information Science and new library and information science professionals must work towards minimizing the problem.
- Governments, on their part, must create more job opportunities for the new graduates.
- The departments of LIS must ensure that they diversify their programmes to allow for specialization in order to enable the new professionals to work either in the public or private sectors.
- The LIS graduates must be able to demonstrate competence in their area of specialization.
- The curriculum in LIS should be more flexible in terms of course offerings and should be also be regularly revised.
- Librarians need to develop confidence in their own skills and to make greater efforts to market themselves effectively.
- LIS graduates must look further afield for new job opportunities and become less reliant on employment agencies that tend to try and place people within sectors in which they have had recent experience.
- The 'Library' tag must be removed from the LIS departments' names, leaving just 'Information Science', because most people are not interested in doing library studies, and hence misconceive LIS departments.

References

Afolabi, M. 1994. *Career opportunities for library and information science professionals in Africa.* Librarian career development Journal, vol(2) 2 pp23-24. (Online) available at www.emeraldinsight.com retrieved on 20/08/08

Aina,L.O. 1995, "*Who's Who in Library and Information Science Training Institutions in Africa*".Ibadan, Archlib and Information Services.

ALA. 2005. *Salary surveys*. (Online) available at www.ala.org *retrieved on* 20/08/08

Andrews, A.M. & Ellis, D. (2005). The changing nature of work in library and information services in the UK: an analysis, *Education for Information* **23** (2005), pp. 157–177.

Griffiths, J.M. 2000. "Back to the future: information science for the new millennium."Bulletin of the American Society for Information Science vol 26.4 pp 24-27

Gupta, S. and Gupta, D. 1993. "Development of library education in South Africa. *Journal of Education for Library and Information Science vol 34*, p.253

LIASA. 2006. *A career as a librarian and information professional*. (Online) available at www.liasa.org.za/ retrieved on 19/08/08

Mach, M. 2003. *Real job titles for Library and information science professionals*. (Online) available at www.michellemach.com/jobtitles/realjobs.htm retrieved on 19/08/08

Missingham, R. 2006. *Library and information science: Skills for twenty first century professionals*. Library management Journal, vol (27) 4/5 pp 257-268 (Online) available at www.emeraldinsight.com retrieved on 15/08/08

Ocholla, D.N. and Bothma, T. 2007. *Trends, challenges and opportunities for LIS education and training in Eastern and Southern Africa*. New Library World, Vol.108, 1/2 :55-78

Ocholla, D.N. 2000. *Training for library and information studies: a comparative overview of LIS education and in Africa*. Education for Information 18: 33-52.

Ocholla, D.N. 2005. *An analysis of the job market in library and information services in South Africa: Some thoughts and empirical evidence*. Paper presented at the 9th LIASA (RETIG) Annual Conference, 25-30 September 2005, Nelspruit, Mpumalanga.

Ocholla, D.N 2007. *The Current Status and Challenges of Collaboration in Library and Information Science (LIS) Education and Training in Africa*. (Online) available at www.ifla.org/IV/ifla73/papers/134-Ocholla-en.pdf retrieved on 15/08/08

Soo-Gaun Koo, C. 2005. Competencies for new era librarians and information science professionals. (Online) available at www.emeraldinsight.com retrieved on 15/08/08

Synman, R. 2000. *Employment market for information professionals in South*

Africa. A paper delivered at LIASA Conference, Durban, 26-29 October.

Thapisa, A. 1999. Developing lasting competencies for a twenty-first century information economy workforce in Africa, *Library Management* **20** (2), pp. 90–99.

Issues and challenges on the use of scholarly electronic journals by the academic community: a literature review

Margaret Mgobozi[15] – mmgobozi@pan.uzulu.ac.za
University of Zululand Library

Abstract

The aim of this paper is to explore and review literature related to the use of scholarly electronic journals by the academic community. The dramatic explosion of the Internet provided a solution to the problems being experienced by printed journals with the advent of alternative, non-print-based publications known as electronic journals. Electronic journals are serial publications that are available in digital format. Some journals are purely electronic while others also appear in print form. Users may also have free access to some electronic journals, but have to subscribe to others. Electronic journals may be divided into three types, i.e. online, CD-ROM and web-based electronic journals. This study reveals that the scholarly activities of the academic community appear to have been gradually transformed by the introduction and use of electronic journals. The reviewed studies demonstrate that the level and understanding of electronic journal utilization by the scholarly communities of various disciplines may differ. An analysis of the literature in terms of the use of electronic journals shows that libraries, particularly academic libraries, have a major role to play in the provision of scholarly information. The use of electronic journals by the academic community is gradually increasing - earlier studies indicated lower utilization while later studies suggested an increase in the use of electronic journals.

Keywords: Scholalry Journals; Electronic Journals; Academic Community; Literature Review

1.   Introduction

A scholarly journal may be defined as a periodical devoted to disseminating current research and commentary on developments within a specific discipline, sub-discipline, or field of study, usually published quarterly or bi-monthly and bound into continuously paginated volumes (Reitz, 2001). The Dictionary Unit of South Africa (2002:623) defines the journal as a newspaper or magazine dealing with a particular subject. It further defines a "scholar" as a specialist in a particular field of study, a distinguished academic, and/or a person who is highly educated. Combining the two definitions therefore means that a scholarly journal is an academic journal dedicated to a specialized field of study. Scholarly journals are therefore periodicals whose goal is scholarly communication, providing the means by which scholars and researchers share their findings with one another and with the public. In turn, research articles are peer-reviewed and are often published by a scholarly association.

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[15] Margret Mgobozi is an Information Librarian at the University of Zululand Library, South Africa. She is currently enrolled for a PhD in the Department of Library and Information Science. This paper is based on a literature review from her masters dissertation of 2002

The aim of this paper is to explore and review literature related to the use of scholarly electronic journals by the academic community. The scope of this paper comprises the origin of the scholarly electronic journal, characteristics of electronic journals, methods used for accessing electronic journals, uses of electronic journals, studies on the use of electronic journals by the academic community, and an investigation into scholarly communication.

2.   The Origin of the Scholarly Electronic Journal

2.1   The traditional printed journal

Historically, Wells (1999) notes that communication between scholars relied heavily on personal contact and meetings that were arranged by early learned societies, such as the Royal Society. Because these societies were highly popular, only so many people could attend the meetings; therefore the proceedings that were usually circulated as proof of the last meeting became a way to disseminate papers for the benefit of the members who were not (or could not be) present at the meetings. Scholarly journals were therefore developed in this way (Wells, 1999).

Walker (1998) informs us that the Royal Society of London published the first issue of the first scientific journal in 1665. The first published journal was the *Journal des Scavans* followed by *The Philosophical Transactions of the Royal Society* (Harter & Kim, 1996; Oppenheim, Greenhalgh & Rowland, 2000:362 & Wells, 1999). According to these authors, the journal's purpose was to disseminate the results of members' research, and in so doing, allow scientists to reach a wider audience. Walker (1998) notes that journals consequently became a way of disseminating new discoveries, and were soon accepted as permanent records of research and archived by libraries. The peer-review of all or most articles was instituted in order to screen and improve publications. Previous research was woven into the fabric of the new by way of citation to earlier articles (Walker,1998).

It is recognized that journal numbers have grown steadily over the years, most of them supported and sponsored by the societies that promote certain scientific disciplines. Publication costs were initially recovered from the money paid by members in the form of journal subscriptions. While some of the journals were published by non-profit institutions, such as universities and government (Walker, 1998), most journals were published by scientific societies.

Commercial publishers were at first not involved in the process as there was "little potential for profit", as Walker (1998) puts it. The scholarly community, comprising mainly of academics and postgraduate students, submitted research papers for publication, which in turn helped them acquire jobs, grants, tenure and promotion (Walker, 1998: Ocholla, 1999:121 & Oppenheim, Greenhalgh & Rowland, 2000:362).

Global competition caused an increase in the number of scholarly research publications, thus attracting commercial publishers who, in turn, offered their professional publishing skills. New journals were started, and this drove the commercial publishing industry to merge and facilitate communication between researchers, academics and librarians. The scholarly publisher was therefore dependant on the researchers for authorship, while libraries, mostly academic libraries, were dependant on the researchers for income (Oppenheim, Greenhalgh & Rowland, 2000:362). The rising costs of published journals and budget cuts in academic libraries eventually led to a serial crisis. According to Oppenheim, Greenhalgh & Rowland (2000:362), journal subscription rates rose by 12% in 1998, which was even faster than the rate of inflation. This led to a drastic cancellation of subscriptions by academic libraries and raised conflict in the function of the journal as a means of promoting scholarly communication. Harter (1998:507) opines that rising costs and long publication delays were ultimately what led to the criticism of the scholarly printed journal.

2.2   The Electronic Journal

The dramatic explosion of the Internet, particularly the World Wide Web, provided a solution to the problems experienced by printed journals, mainly because of the advent of alternative forms of conventional printed journals, known as electronic journals (Harter, 1998). The World Wide Web therefore became a new medium for publishing scholarly journals. As a result, the number of electronic journals started proliferating in various academic fields (Koehler, 2000). McLuckie (1998) observes that innovations in information technology have encouraged the move towards electronic journals because technology facilitates the effective and efficient creation, storage, transfer and delivery of electronic information. According to Chan (1999), the idea of an electronic scholarly journal was first conceived by Sondak and Schwarz in 1973. Their vision entailed the distribution of computer-readable files of journals to libraries, and the distribution of computer-output microfiche to individual subscribers. Joint projects between publishers and libraries resulted in the emergence of various distribution systems of electronic data, from CD-ROM to local data loading - where publishers provide image and text data directly to libraries (Chan,

1999). Electronic journals formally kick-started in the 1990's, although they had been in the pipeline since 1976 (Harter & Kim, 1996 and Bearman, Prior and Pudlowski, 1999). Harter and Kim (1996) state that the *Online Journal of Current Clinical Trials* (*OJCCT*) was the first peer-reviewed, full-text, electronic journal, and even had graphics.

2.2.1 Characteristics of Electronic Journals

Electronic journals are serial publications that are available in digital format. These journals may be distributed electronically in various ways, such as through CD-ROMS or the Internet. Those available on the Internet can be accessed via the World Wide Web and/or through email. Some journals are in ASCII text while others are in HTML format. Still others use formats such as Adobe's PDF. There are journals that are purely electronic, while others also appear in print form. Users have free access to some electronic journals while needing to subscribe to others (Klemperer, 1999). Although these journals are electronic in form, they can and do index or review paper-based publications (Mogge, 1999:20). Electronic journals that often scan images of print versions tend to be available as PDF files.

2.2.2. Types of electronic journals

Electronic journals may be divided into three types, i.e. online, CD-ROM and web-based electronic journals.

2..2..2.1 *Online electronic journals*

Sweeny (1997) refers to the online electronic journals as "pay as you go".   DIALOG is perhaps the best example of how powerful searching tools are used to retrieve documents from printed journals. These journals are printed on paper and thereafter scanned, stored and distributed electronically. An entire issue may be distributed electronically to a membership list, or only the table of contents and abstracts may be provided with specific information on how to obtain the full electronic text or article. According to Rao (1998), these journals are also referred to as digitized journals.

2.2.2.2   *CD-ROMS*

CD-ROMS tend to be electronic versions of existing printed journals. Powerful search tools are used with CD-ROMS.

2.2.2.3   *Web-based electronic journals*

Rao (1998) has referred to these as electronic journals that are digital in form. These journals are produced, processed, edited, stored, reviewed and distributed to subscribers electronically, without any print versions.

2.2.3.   Advantages and disadvantages of electronic journals

2.2.3.1.   *Advantages*

Electronic journals offer many solutions to problems that are facing information management centers today. The most important features are the following:

- *Space-saving*

Space saving is one of the most cited advantages of electronic journals in literature (Bandyopadhay, 1999; Cook, 1992:33; & Sweeny, 1997). Electronic storage is more efficient than providing shelf-space for a number of volumes.

- *Speed of communication*

It is obvious that electronic journals also improve the speed of communication by providing updates on recently published material and allowing for the swift transmission of research results and scholarly communication (Sweeny, 1997; Rao, 1998 & Mountifield & van Brakel, 1994). Chan (1999) concurs that the electronic transmission of journals saves valuable time, especially in terms of the review process, thus enabling efficient network communication between authors, editors and referees.

- *Provision of powerful searching tools*

Words and terms in the records on the database can be searched and combined with Boolean operators (AND, NOT, OR) to find specific articles. Specific periods or years can also be used to broaden or narrow the search (Fisher, 1995). Several databases can be searched simultaneously, thus allowing a large collection of material to be retrieved instantly.

- *Accessibility*

Electronic journals provide immediate access to sought after information (Fisher, 1995; Sweeny, 1997 & Bandyopadhay, 1999). Rao (1998) reinforces this by saying that electronic journals facilitate precise access to the archive of knowledge. Finding articles or journals can take minutes or even seconds, which is very different to the long waiting periods experienced with printed journals (Chan, 1999).

- *Value-added features*

Facilities such as integrated text, hypertext links, etc; are also offered by electronic journals. Holovak & Settler (1997) explain how navigational aids, such as an internal hyperlink between a mention in text and the corresponding figure, table, or equation, or from bibliographic citations in text to the reference list at the end of the article; are examples of value-added features. According to Chan (1999), further advantages are that the printing and mailing processes are eliminated, while authoring and

publishing systems are integrated easily into computer readable text. Valuable time is saved through electronic transmission, especially in the review process.

- *Cost-effectiveness*

Electronic journals are cost effective as far as the printing of paper and mailing to subscribers is concerned (Rao, 1998). A number of academic and public institutions are faced with budget cuts that have forced them to cancel subscriptions on a number of journals. Electronic journals therefore offer solutions in this respect, as there are some that are either free or inexpensive and affordable to end-users (Moret 1997; Mountifield and van Brakel, 1994:30). Chan (1999) states that there is a potential saving of twenty-four to thirty-six percent, which is accomplished by the elimination of printing and postage costs.

- *Up-to-date information*

Information published in electronic journals tends to be up-to-date, seeing as there are no printing and distribution delays. Rao (1998) emphasizes this in observing that published electronic articles may be available within forty-eight hours after being approved by the preview team.

Mountifield and van Brakel (1994:31) support the view that electronic journals may be distinguished from printed journals because they appear in a non-static form and are therefore irregular. Articles can be submitted, refereed, amended and updated at the same time, and published as soon as they are ready. There is an "active dissemination mechanism", as Chan (1999) defines it, such that whenever new articles are accepted into the database, users are alerted at their desktops. The *South African Journal of Information Management* (*SAJIM*) is an example in this case, as it is designed to send subscribers e-mail notifications whenever any of the journal's articles or columns have been updated (van Brakel, 1999).

2.2.3. *Disadvantages*

Evidently, there are still problems related to the use of electronic journals.

- *Technological barriers*

For the storage and display of electronic journals, they rely on technology and equipment that is rather expensive and not affordable to users with poor incomes (Chan, 1999). Computer literacy is also a problem. Some users are still not familiar with electronic mail, file transfers, handling of network and mainframe software or downloading operations (Mountifield and van Brakel, 1994:31).

Although information delivered electronically may be cheap, the cost of computer hardware is high (Sweeny 1997). Files that are transferred electronically are also sometimes disrupted by network problems. As electronic journals become more technologically advanced, the speed and bandwidth of networks also affect delivery. Chan (1999) adds that the screen quality of graphics and photos are still primitive when compared to print journals.

- *Sociocultural barriers*

Electronic interfaces can take a long time to master, thus frustrating end-users. Reading from a computer can also not compare to reading printed material – the process tends to be slower and less comfortable.

- *Economic barriers*

The equipment used for displaying, storing or printing electronic journals is expensive. Users may not be in a position to download and print each and every article they need as this may lead to high economic and ecological costs. Some electronic journals are not free and charge subscription fees (Chan 1999). Mackay (1999) cautions that in order to receive access to electronic journals at no additional charge, academic institutions need to subscribe to the journals' print versions. Thus, in order for academic institutions to gain access to every electronic journal published, they must inconveniently subscribe to a number of aggregator services as well as multiple publishers.

- *Ownership versus access*

With print journals, the academic institutions own whatever journal they have paid for and subscribed to. This is not the case with electronic journals because they are not received, but accessed (Mackay, 1999).

2.2.4.. Methods used for accessing Electronic Journals

Electronic journals may be an answer to the current problem of information overload, wherein the scholarly community finds it difficult to keep pace with developments in their various disciplines. Accessing information from places of work is an added advantage of electronic journals. Electronic journals are also said to provide continuous and instant access to relevant material (Eason, Carter and Harker, 1997).

Van der Walt and van Brakel (1995:57-63) list the following as methods that may be used to access electronic journals:

- Personal electronic communication, where electronic mail is used to transfer messages between users. Electronic journals may also be distributed in this format. Electronic list managers are also useful in distributing content pages and individual articles to subscribers.

- Internet facilities are used for transferring information and files between different sites or PCs. The file transfer protocol is used for the physical retrieval of archived issues of electronic journals.

- Direct access to specific titles, including databases, of solely electronic journals.

- Online directories of electronic journals, such as the Directory of Electronic Journals, newsletters, and academic discussion lists; provide a description of each electronic journal, its subscription procedures and costs.

The above methods, as provided by van der Walt and van Brakel (1995), are used mostly for network-based electronic journals. However, Machovec (1997) reiterates that electronic journals are also offered to the public by the publishers and aggregators. Publisher-based electronic journal projects include: project Muse (http://muse.jhu.edu/), High Wire Press (http://highwire.stanford.edu), Elsevier Press (http://www.elsevier.com), Blackwell Science (http://www.blackwell-science.com), Springer-Verlag (http://www.springer.co.uk), and Academic Press IDEAL (http://www.idealibrary .com) [Machovec, 1997].

Machovec (1997) adds that a number of electronic journals from a variety of publishers are combined and provided through common gateways such as: OCLC Electronic Collections Online, Blackwells Electronic Journal navigator, Institute for Scientific Information, the JSTOR, Ovid Technologies Inc., EBSCO, Information Access Company, DIALOG, Emerald, and University Microfilms International.

Access to most electronic journals is provided to the subscribing institutions through license agreements. Bona-fide members of these institutions may therefore also receive licenses, but the onus lies with the institution to ensure that only members have access (Edwards, 1997).

2.2.5. Uses of Electronic Journals

Motivations for making the most of electronic journals are founded on the main role players, i.e. authors, publishers, librarians and journal users (Hitchcock, Carr and Hall 1998). The motivations are as follows:

- Publishers - adding value to journals;

- Librarians - improved information retrieval; and

- Users - faster, more direct access to information, and the ability to act on information.

Electronic journals are therefore in a position to play an important role in the provision of information. For example, seeing as journals are used for the sharing of up-to-date research results, the efficiency of this service could be vastly improved by using electronic journals (Eason, Carter and Harker, 1997).

The aspect of scholarly communication that is most enhanced by the use of electronic journals is teaching, as a study conducted by Milne (1999) confirmed. Academics whose primary focus was teaching were more likely to use electronic journals than full-time researchers. The latter were less inclined to accept electronic journals in publications or scholarly activity.

2.2.6. Studies on the use of Electronic Journals by the Academic Community

Bibliometric research techniques based mainly on citation analyses as the primary method of investigation have been considerably criticized. However, Harter (1998) suggests that citations do reflect an influence of some kind on the author of the citing article. Harter (1998) therefore conducted a study that aimed to gather raw data on the actual impact of electronic journals on scholarly communication. The study's main objective was to assess the extent to which scholars and researchers are influenced by, and base their own work on, research published in electronic journals. One of Harter's findings was that journals with fewer articles tend to influence less researchers and authors and therefore contribute less to the advancement of knowledge (Harter, 1998).

Harter's (1998) study also revealed that scholarly, peer-reviewed electronic journals had no impact on formal scholarly communication in their respective fields. The conclusion he drew in the study was that authors and readers need to view electronic journals as legitimate publication vehicles before they can assume a significant role in the scholarly communication process.

Scholarly communities in various disciplines differ in their use of electronic journals. In a study by Milne (1999), scholars from three disciplines, i.e. science, social sciences and the humanities; displayed distinct differences in their use of electronic services. The study's findings also hinted at an increased pattern of use of electronic journals/services by the academics from the three disciplines.

Ashcroft and Langdon (1999:105) investigated the benefits of and barriers to the purchase of electronic journals in university library collections in the United Kingdom and North America. The survey method was used to obtain librarians' perceptions of these benefits and constraints. The conclusions the authors drew from this study were that librarians are aware of the benefits of electronic journals, and these journals have become an integral part of higher education library collections. The authors noted that major concerns were concentrated around permanent archives and site

licenses. They also noted the suggestion made by the respondents that future surveys should include end-user statistics.

Cargille and others (1999) produced a paper on electronic journals and users. Three librarians gave their views on changes in the delivery of library services that came as a result of the introduction of electronic journals. The paper is divided into three sessions. The first one, as Cargille explains, was by Degener, who wrote about the impact of electronic journals on the medical library setting. Degener noted that many researchers in the medical library community were relying more on electronic journals. He felt that electronic journals were more convenient to use because they are accessible twenty-four hours a day, seven days a week. The authors further noted that added features provide additional opportunities to work more efficiently and effectively; printed copies are cleaner than photocopies; and access to electronic journals has affected the reading habits of some researchers.

Liew, Foo and Chennupati (2000:302) conducted a study on the use, perception and future expectations of electronic journals by graduate end-users from Nanyang Technological University and the National University of Singapore. The main objectives of the study were to determine the level of use of journals (both print and electronic), the users' preferred medium, and their expectations and concerns for the future. The study sought to determine the level of familiarity with the current offering of electronic journals, and to examine to what extent additional interactions, features and functionality were deemed useful and desirable by end-users (Liew, Foo and Chennupati, 2000:303). It is reported that over 70% of the participants had used electronic journals, although it was obvious that respondents had more experience with print journals. However, 73% preferred the electronic medium (Liew, Foo and Chennupati, 2000:304). The authors concluded that the interest in the use of electronic journals by end-users is growing.

A study by Rao (2001:169) explored why it is necessary to adopt electronic journals in scholarly communication. Rao (2001: 172) found that they have the added advantages of easy access, greater speed and ease of communication, and less associated costs. Rao (2001:174) further found that publishing in electronic journals has slowly gained acceptance, especially following the inclusion of the referee system and peer-review by major publishers. Academic institutions were also accepting electronic publications by their faculty members for tenure and promotion purposes (Rao, 2001:174). Johnson (2001:166) adds that students increasingly expect all the information they seek to be provided in electronic format.

Gyeszly (2001:5) conducted a study meant to indicate what library administrators would choose between electronic and print journals. The study's incentive was the escalating price of the ever-increasing amount of electronic journals, even while subscriptions were still being paid for both

electronic and print journals. Among the objectives of the study, as indicated by Gyeszly, were the following:

- To identify the sources of the full-text online journals;

- To compile a list of all the electronically available titles in the political science and economic disciplines;

- To collect the end-user data of all electronic journals costing more than $500 per year;

- To determine the annual subscription prices of the core journals of political science and economics disciplines during the academic years of 1998-2000; and

- To analyze and compare the percentage price increases from 1998 to 2000.

The end-user data of the electronic journals in the study was based on the number of hits cumulated by users' requests via the websites of the Texas A & M University Libraries (Gyeszly, 2001:6). According to the author, the available user statistics of the electronic journals were not convincing enough for the library administration and collection development officers to cancel any print subscriptions. The library was therefore compelled to pay for both electronic and print journals as some publishers do not allow the termination of print journals, even if the utilization of electronic journals is greater. Gyeszly concluded that the faculty staff and students were satisfied with the use of electronic journals, and that there appeared to be an increase in the use of electronic journals over printed journals.

Nelson (2001:205) conducted a study to evaluate the extent to which the potential of electronic journals was being realized within the United Kingdom's academic community. The conclusions drawn from the study were that:

- Most scholarly journals will ultimately be available in electronic format;

- The potential of electronic publishing to transform scholarly communication lies in the following: the ability of individuals to publish their own work on the World Wide Web, making it freely available to the scholarly community; the level of success of learned societies in publishing high-quality peer-reviewed journals which are either free, or at least cheaper than equivalent journals from commercial publishers; the speed of publication; and the ability of the electronic medium to transform electronic journals' content by including links to other material, such as multimedia presentations, access to databases, and interactive functionalities;

- The scholarly impact of electronic journals in the United Kingdom was still low; and

- The use of electronic journals was also still low.

Mgobozi (2002:7) conducted a study on the use of electronic journals for the dissemination of scholarly information at the Universities of Natal and Zululand. An attempt was made to determine the level of electronic journal utilization and the perceived impact that these journals have on the community. Mgobozi (2002:87) observed that the level of use and cognizance of electronic journals was significantly lower than that of printed journals; hence, it followed that the scholarly community leaned more towards the use of print media. The author was able to measure the perceived impact that the electronic journals have on the scholarly community, although the real impact could not be ascertained. A strong perceived impact was found to exist within the scholarly community (Mgobozi, 2002:96).

A survey on the use of electronic databases and electronic journals accessed through the Web by the academic staff of the Israeli Universities was conducted by Bar-Ilan, Peritz and Wolman (2003:346). The major results were that the use of electronic journals and databases was already widespread among the respondents (more than 50% found electronic services indispensable), and electronic services were increasingly being adopted by the academic community. An increase in the use of electronic journals was also demonstrated in a study by Smith (2003:162), where the author explored the role electronic journals play in a faculty's weekly scholarly reading habits. The academic community was found to rely more on electronic journals than on print media, and this, as Smith (2003:162) notes, is a significant milestone on the timeline of electronic journal utilization.

The assimilation of the electronic journal is further confirmed by Wulff's (2004:315) study, where the author examined the patterns of use of electronic journals supplied by an academic health sciences library. The aim was to find out whether the patterns of use of electronic journals differed significantly from the patterns of use of corresponding print titles, and to relate the applicability of print collection development practices onto an electronic environment. The conclusion drawn from this study was that collection development practices based on quality and user needs can be applied with confidence to the electronic environment (Wulff, 2004:315).

Nicholas and Huntington (2006:50) found that users were taking full advantage of the electronic journals that were offered to them. More people were found to be accessing electronic journals than was previously the case with printed media. The authors further found that searching occurred more widely as linking became easier and abstracts were popularized (Nicholas and Huntington, 2006:48). Borrego and Urbano (2007:243) state that data on the use of electronic products can be used to carry out comparative studies on topics such as the difference in electronic products in different institutions; the consumption of scientific information in different areas of knowledge; and how electronic publications are used in comparison to their printed forerunners. The purpose of their research was to analyse the behaviour of the users of electronic journals using the data of consumption per IP address. They found that there was a greater dispersion of the consumption of electronic information than of information on paper (Borrego and Urbano, 2007:243). The study also found that the number of abstracts viewed is a good predictor of the number of regular users of a journal.

In developing countries, poor infrastructure is the main reason for the low or non-use of electronic journals. Ajegbomogun (2007:27) focused on impediments to harnessing scholarly electronic journals on the Internet in developing countries through a case study of a Nigerian university. The research objectives of the study were as follows:

- To identify the categories of Internet users and their use of the Internet.

- To determine the availability and usefulness of scholarly electronic journals and research output on the Internet.

- To determine users' point of access to scholarly electronic journal resources on the Internet.

- To identify the problems faced by users in their information seeking patterns on the Internet.

- To offer suggestions on how to harness electronic journals on the Internet.

The findings from Ajegbomogun's (2007:31) study were that:

- Electronic resources available on the Internet were underutilized by the users, although the little access that they had increased their research and teaching output.

- The level of Internet use was low when compared to similar institutions in developed countries.

- Respondents gave lack of time and lack of personal computers as the main reasons preventing them from achieving their maximum potential in research output.

- Respondents were able to access the Internet using cyber café facilities, but these were not good enough because there are only a limited number of computers and the charges for using them are enormous; hence a lot of potential users are discouraged.

- Inadequate infrastructure, particularly telecommunications facilities, continues to put off the technological advancement of most library users in developing countries.

The author therefore recommended that the highest priority must be given to university libraries in Nigeria so that they may remain centres of excellence, play their role as knowledge disseminators, and fully unearth their potential in order to compete with the best in the world (Ajegbomogun, 2007:31).

Zainab, Huzaimah and Ang (2007:558) found that electronic journals were used by respondents to search for new information, read full-text articles and abstracts, and browse the table of contents. Most respondents read the abstracts first to determine relevance before downloading the articles. It was also found that most respondents believed that electronic journals will co-exist with print journals, 25.5% believed that they would replace the print journals, and a further 25.5% stated that they would supplement them (Zainab, Huzaimah and Ang, 2007:558).

There has been growing interest in the use of electronic journals by the academic community, as reflected in a study by Moghaddam and Talawar (2008:15). The purpose of their study was to investigate the use of scholarly electronic journals at the Indian Institute of Science. The aim of the study was to identify user's opinions on different features of electronic journals, their awareness of the electronic journals' services, their use of different publishers, the purpose of their use and their most preferred

formats. The results of the study reflected a growing interest in electronic journals among users at the Indian Institute of Science. Convenience and accessibility were the most important considerations cited by the users in opting for electronic journals, which were (mostly) used for research needs, education and locating current information (Moghaddam and Talawar, 2008:22). Scientists were found to be more advanced in their use of electronic journals when compared to other faculty disciplines, whilst PDF was found to be the most preferred format of electronic journals (Moghaddam and Talawar, 2008:22). The results also suggest that twenty-four hour access to electronic resources increases the acceptance and use of electronic scholarly journals (Moghaddam and Talawar, 2008).

3.   Scholarly Communication

Shaughnessy in Milne (1999) has defined scholarly communication as "the social phenomena whereby intellectual and creative activity is [sic] passed from one scholar to another". Milne (1999) emphasizes that formal and informal communication are what make scholarly communication possible. According to Milne (1999), formal communication entails the writing of articles for inclusion in journals, whereas informal communication includes conference visits, discussion groups and general networking to find out what is going on in a particular discipline. An important role in the system of scholarly communication is played by academic libraries, academic staff and postgraduate students, publishers of academic journals and books, and learned societies. Increasingly, the Internet is heavily relied on in speeding up and easing scholarly communication within the academic community.

The scholarly community is known to encourage informal or formal communication between/among academic colleagues. Informal communication can range from personal communication through conversation, newsletters and discussion groups, to full-scale national and international conferences. Research reports may therefore be distributed in this format (Eason, Carter and Harker, 1997). In some cases, Eason, Carter and Harker observe that informal and formal methods are used together. Thus, the authors note that academics who are busy and do not have time to engage in formal searches may use the informal network to identify what is worth finding and studying in journals and books. Ocholla (1999:12) elaborates on scholarly communication amongst academics and observes that academics are identified according to their scientific activities and communication in addition to their academic activities. He notes that in addition to conducting academic research, academics prepare and report research results, publish and teach. These activities therefore all form part of formal and informal scholarly communication. Postgraduate students and

75

library staff, who either help or are subjects in research, also participate in these activities.

Kuhlen and Zhang (1997) state that scholarly literature is an essential aspect of the scholarly communication process and argue that it is the formal foundation and basis of scientific communication. According to Eason, Carter and Harker (1997), formal communication proffers several services, i.e.:

- It is a public and permanent record of the achievements of the discipline.

- It is a peer-reviewed, quality assured record that meets the performance criteria of the discipline. It may also be a record that obeys the specialist conventions and language of the discipline, hence facilitating swift communication with fellow scholars.

- It is a testament to the current state of knowledge in the discipline.

- It provides a place for authors to register their achievements, following which they can be assessed by colleagues for career progression and/or status recognition in the field. It also serves as a means of attracting new recruits (Eason, Carter and Harker, 1997).

Varian (1997) notes that the academic reward system is structured to encourage the production and dissemination of good ideas that are widely read and acknowledged. Thus, according to Varian (1997), it is part of the researcher's job to produce scholarly publications.

The three main roles of scholarly communication, as identified by Getz (1997), are teaching, the provision of knowledge to the community, and developing new knowledge. There is an integration of roles among the key players of scholarly communication, i.e.: the scholars conduct research and write articles for publication; the publishers and learned societies accumulate, copy-edit, produce, and distribute articles; and the academic libraries buy, store and disseminate scholarly journals (Wells, 1999).

Vassallo (199:232) introduces the process of organizational integration, brought about through the development, adoption, and implementation of the concept of the knowledge continuum. He says that the knowledge continuum assesses the various elements that contribute to scholarly communication and provides a continuum of support services, whereby the identification, absorption, utilization and manipulation of existing knowledge merges with the organization, formation, and dissemination of new knowledge. This process includes research input and output, which are important in the scholarly communication process. According to Vassallo (1999:234), the knowledge continuum is best served by an organizational structure that extends its contribution and role in the

scholarly research process to produce and disseminate results that benefit scholarly communication.

Studies show that academic or scholarly journals play an important role in the dissemination of scholarly information (Dean, 1997; Eason, Carter and Harker 1997; Wells, 1999; Harter, 1998:507; Milne, 1999; Oppenheim, Greenhalgh and Rowland, 2000:361). This role is clearly articulated by Harter (1998:507), who reiterates that the scholarly journal has served as the primary medium of scholarly communication for more than three centuries, and has remained basically unchanged in form and function since its inception. This role, however, differs from discipline to discipline. Some disciplines use journals primarily for information dissemination, while others prefer books for this purpose (Ocholla, 1999:136). Harter (1998:507) further reiterates that despite the popularity of printed journals, they have also been criticized because of problems relating to the peer-review process; high costs; and the lack of selectivity

3.1.   *Scholarly communication and electronic journals*

It is generally believed that electronic journals will transform the scholarly communication system (Harter, 1998:507). However, Harter warns that electronic journals can only succeed in this transformation if they are integrated into the process of scholarly communication. Academic scholars need to read electronic journals and write the articles that get published in them because without [academic scholars'] active contribution in terms of readership and authorship, electronic journals cannot prosper. Harter (1998:508) suggests that scholars must be influenced or affected by the findings reported in electronic journals enough to build or modify their own research and scholarship. Oppenheim, Greenhalgh and Rowland (2000:365) add that scholarly inquiry in the new medium of electronic journals is expected to proceed more quickly, interactively and globally than the original printed medium. There is, however, a lot of information that may be classed under academic and not scholarly journals. Therefore, as Oppenheim, Greenhalgh and Rowland (2000:365) argue, it is important to be able to distinguish between the two, and to address the role of publication and the values held by the scholarly community.

4.   Challenges

The use of electronic journals by the academic community poses a number of challenges, some of which are as follows:

- *Provision of ICT facilities in libraries*

The provision of ICT facilities in libraries may enhance the use of electronic journals by users, especially students. Some libraries still lack ICT facilities, such as electronic classrooms with sufficient high-end electronic equipment.

User education

Users need to be trained and educated in the use and importance of electronic journals. This process calls for collaboration between the academic and library staff. Getting the library staff to educate the academic staff on the use of such services could do this. The academic staff in turn would be able to pass the information on to students, possibly by recommending the use of such services and/or encouraging consultations with the library staff. Short courses on the value, availability and use of electronic journals should also be offered.

- *Electronic publishing*

The scholarly community should be encouraged to publish in electronic journals. This would improve their use and understanding of electronic journals.

- *Methods of access*

Students and staff should have easy access to the electronic journals offered by their library.

- *Inadequate support of infrastructure*

Inadequate support of infrastructure, particularly telecommunications facilities, continues to disrupt the technological progress of most library users in developing countries.

- *Non-availability of personal computers*

The lack of personal computers prevents some members of the academic community from achieving their maximum potential in research output.

6.   Conclusion

This study revealed that the scholarly activities of the academic community are slowly being transformed by the introduction and use of electronic journals. However, Harter (1998:508) made the observation that electronic journals can only impact on scholarly communication if they are integrated into the research process. This process, as Harter (1998:508) suggests, can be enhanced if the findings reported in electronic journals help scholars develop their own research.

The reviewed studies also revealed that the level and understanding of electronic journal use by the scholarly communities of various disciplines may differ. Ocholla (1999:136) found that some disciplines prefer journals

for information dissemination while others prefer books. This possibly also applies to the electronic vs print journal debate. It is evident in the literature that there are various disciplines that are already fully engaged in the use of electronic journals, while others (maybe purposefully) lag behind.

An analysis of the literature in terms of the use of electronic journals shows that libraries, academic libraries in particular, have a considerable role to play in the provision of scholarly information. Studies also support the notion that lack of adequate resources affects the use of electronic journals - high-end technologies, which are necessary for access to these journals, may not be affordable to poor libraries and users (Chan, 1999; Mgobozi, 2002:105 and Ajegbomogun, 2007:31).

Despite this, the use of electronic journals by the academic community is gradually increasing - earlier studies (Harter, 1998; Nelson, 2001:205; Mgobozi, 2002:103) cited a low prevalence rate, while later studies (Smith, 2003:162; Nicholas and Huntington, 2006:50; Borrego and Urbano, 2007:243; Zainab, Huzaimah and Ang, 2007:558; and Moghaddam and Talawar, 2008:15) all noted an increase in the use of electronic journals.

References

Ajegbomogun, F. O. 2007. Impediments to harnessing scholarly electronic journalson the Internet in developing countries: A Nigerian University case study. *Library Hi Tech News*, number 6:27-32

Ashcroft, L. and Langdon, C. 1999. Electronic journals and university collections.*Collection Building*, V.18 (3):105-113

Bandyopadhay, A. 1999. Accessing SCI-tech literature: commercial document delivery services and online full-text databases. *Collection Building*, V. 18(1):10 Retrieved June 9, 1999 from Emerald-Library Database.

Bar-llan, J.; Peritz, B. C. & Wolman, Y. 2003. A survey on the use of electronic journals accessed through the web by the Academic Staff of Israeli Universities.*Journal of Academic Librarianship*, Vol. 29(6):346-361

Borrego, A. & Urbano, C. 2007. Analysis of the behaviour of the users of a package of electronic journals in the field of chemistry. *Journal of Documentation*, Vol. 63(2):243-258

Cargille, K.; Degener, C. Barker, J. W. & Huang, T. 1999. Electronic journals and Users: three perspectives. *Serials Review*, Vol. 25(3):47

Chan, L. 1999. Electronic journals and academic libraries. *Library Hi Tech*, Vol. 17(1)

Cook, B. (ed.) 1992. *The electronic journal: the future of serial-based information*. New York: The Haworth Press

Eason, K.; Carter, C. & Harker, S. 1997. *A Comparative Analysis of the Role of Multi-Media Electronic Journals in Scholarly Disciplines*. Available online on:
Http://www.ukoln.ac.uk/services/elib/papers/tavistock/eason.html
Accessed on December 11, 2000.

Edwards, J. 1997. *Electronic Journals: problem or panacea?* Retrieved December 11, 2000. Available online: http://www.ariadne.ac.uk/issue10/journals. Accessed on December 11, 2000

Fisher, S. 1995. *Access to information. Library Management*. Vol. 16(5). Available Online: Emerald-Library Database. Accessed on August 6, 1999

Gyeszly, S. D. 2001. Electronic or paper journals? Budgetary, collection development, and user satisfaction questions. *Collection Building*, Vol 20(1):5-10

Harter, S. P. 1998. Scholarly communication and electronic journals: an impact study. *Journal of the American Society for Information Science*, 49(6):507-516

Harter, S. P. & Kim, H. J. 1996. Electronic journals and scholarly communication:a citation and reference study. *Information Research,* Vol. 2(1)

Hitchcock, S.; Carr, L. & Hall, W. 1998. *Making the most of electronic journals.* Available online: http://xxx./anl.gov/html/cs.DL/9812016

Holovak, J. & Settler, K.L. 1997. Transcending the limitations of the printed page. *The Journal of Electronic Publishing*. Available online: http://www.press.umich.edu/jep/03-01/EL.html
Accessed on April 20, 2000

Johnson, G. J. 2001. Issues and policy: Electronic journals strategies at the University of York. *Information Services & Use,* Vol. 21:165-172

Klemperer, K. 1999. *Electronic journals: a selected resource guide*. Available online:http://www.harrassowitz.de/ms/ejresguide.html.
Accessed on December 6, 2000.

Koehler, W. 2000. A bibliometric analysis of selected information science print and electronic journals in the 1990's. *Information Research*, Vol. 6(1)Availableonline:http://www.shef.ac.uk/-is/publication/infres/paper88@.html
Accessed on April 20, 2001.

Liew, C. L.; Foo, S. & Chennupati, K.R. 2000. A study of graduate student end-users' Use and perception of electronic journals. *Online Information Review*, Vol. 24(4):302-315

Machovec, G. 1997. *Electronic journal market overview*. Available online: http://www.coalliance.org/reports/ejournal.html
Accessed on September 9, 1999

Mackay, S.C. 1999. Accessing electronic journals. *Database*, Vol. 22(2):16-18

McLuckie, A.G.1998. *An investigation of the feasibity of the application of electronic journals in university libraries*. Johannesburg:University of the Witwatersrand (Mcom)

Mgobozi, M.N. 2002. *The use of electronic journals for the dissemination of scholarlyinformation by the University of Natal and the University of Zululand: a comparative study*. Masters Dissertation. University of Zululand: Department of Library and Information Science

Milne, P. 1999. *Electronic access to information and its impact on scholarly communication*.Availableonline:http://www.csu.edu.au/special/online99/proce   edings99/305b.htm. Accessed on April 11, 2001

Moghaddam, Golnessa Galyani and Talawar, V.G. (2008). The use of scholarly electronic journals at the Indian Institute of Science: a case study in India. *Interlending & Document Supply*, Vol. 36(1)

Moret, B.M.E. 1997. Bridging the gap between theory and practice. *The Journal of Electronic Publishing,* Vol. 3(1). Available online: http://www.press.umich.edu/jep/03-01/JEA.htmlAccessed on July 23, 1999

Mountifield, H.M. & van Brakel, P.A. 1994. Network-based electronic journals: a newsource of information. *South African Journal of Library and Information Science,* Vol. 62(1):28-33

Nelson, D. 2001. The uptake of electronic journals by academics in the UK, their attitudes towards them and their potential impact on scholarly communication. *Information Services & Use*, Vol. 21:205-214

Ocholla, D.N. 1999. Insights into information-seeking and communicating behaviour of academics. *Intl. Inform. & Library Review*, Vol. 31:119-143. Available online:http://www.idealibrary.com Accessed on May 15, 2001.

Oppenheim, C.; Greenhalgh, C. & Rowland, F. 2000. The future of scholarly journal publishing. *Journal of Documentation*, Vol. 56(4):361-398

Rao, M. K. 2001. Scholarly communication and electronic journals: issues andprospects for academic and research libraries. *Library Review*, Vol. 50(4): 169-175

Reitz, J.M. 2001. *ODLIS: Online Dictionary of Library and Information Science*. Available online:
http://www.wcsu.edu/library/oldis.html#journal
Accessed on March 17, 2001.

Smith, E. T. 2003. Changes in faculty reading behaviors: The impact of electronic journals on the University of Georgia. *Journal of Academic Librarianship*, Vol. 29(3):162-168

Sweeny, L. 1997. The future of academic journals: considering the current situation in academic libraries. *New Library World*, Vol. 98(1132).

Available online:Emerald-Library Database. Accessed on October 6, 1999.

The Dictionary Unit of South African English (ed.) 2002. *South African Concise Oxford Dictionary*, Oxford: oxford University Press.

Van der Walt, P.W. and van Brakel, P.A. 1995. Access methods to electronic journals via the Internet. *South African Journal of Library & Information Science*, Vol. 63(2):56-64

Walker, J. 1998. *Free access to traditional journals. American Scientist*, Vol. 86(5)Availableonline:http://www.amsci.org/amsci/articles/98articles/walker.htm   lAccessed October 3, 2000

Wells, A. 1999. *Exploring the development of the independent, electronic, scholarly journal.* MSc in Information Management, 1998/1999. Electronic Dissertation Library.University of Sheffield: Department of Information Studies. Available online: http://panizzi.shef.ac.uk/elecdiss/edl0001/Accessed on March 22, 2001.

Wulff, J. L. 2004. Quality markers and use of electronic journals in an academic healthsciences library. *Journal of the Medical Library Association*, Vol. 92(3): 315-322

Zainab, A. N.; Huzaimah, A. R. & Ang, T. F. 2007. Using journal use study feedback to improve accessibility. *The Electronic library*, Vol. 25(5):558-574

A Study of the Information Needs of Students on Sexually Transmitted Diseases at the University of Zululand

Wenziwa Sifiso Mkoko[16] - wenziwa@webmail.co.za
Department of Library and Information Science
University of Zululand, South Africa

Abstract

This study aimed to examine the information needs of students on Sexually Transmitted Diseases (STDs) at the University of Zululand. STDs appear to be a huge problem among students at all the campuses in South Africa. The University of Zululand is no different, and is facing an escalating rate of STDs within the university's premises. Talking to students revealed that many of them have contracted the diseases themselves, or know of someone who has a STD. The lack of relevant information sources about STDs presents a barrier to addressing this problem. The presence of the Internet and the World Wide Web proffers benefits that can help students at the university obtain more information on STDs. Statistics and the rate of pregnancy reveal that most students practice unprotected sex, which also leads to the transmission of Sexually Transmitted Diseases. It is therefore important to explore what students are lacking with regard to information on STDs on campus.

Keywords: Information Needs; Students; Sexually Transmitted Diseases; STDs; University of Zululand; Information Needs of Students; Information Seeking

1. Introduction

Sexually Transmitted Diseases (STDs) are diseases that are commonly transmitted between partners through some form of sexual activity, most commonly vaginal intercourse, oral sex or anal sex (Smith, 2001). They were commonly referred to as Venereal Diseases (VD) until sometime in 1990, when public health officials introduced the new term (STDs) in an effort to improve the clarity of their warnings to the public (Adams, 1993). The Centre for Disease Control and Prevention (1999) notes that there are over 15 million cases of STDs reported annually in the United States. The centre found that adolescents and young adults (15-24 years) are at the greatest risk of acquiring STDs, with three million infected each year. It is believed that STDs can be prevented if necessary precautionary measures are taken. Unfortunately, students more often than not fail to take precautions, leading to unnecessary illness. While the reasons for neglecting precautionary measures are complex, they generally include the lack of knowledge and information on STDs. There is also a high level of negligence and denial. For example, a lot of students claim that unprotected sex is more enjoyable (Djarova, 2003).

The aim of this study was therefore to examine the information needs of students on Sexually Transmitted Diseases at the University of Zululand. Its major objectives were to determine if students are aware of what STDs

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[16] Wenziwe Sifiso Mkoko is a final year student in the Department of Library and Information Science.

are; find out whether students are aware of the centers, sources and systems that disseminate information on STDs on campus; to investigate whether students receive satisfactory information about STDs on campus; and to determine the type of information needed by students concerning STDs.

2. Literature review

According to Rockaway (2003:2), when students becoming sexually active, they are entitled to know the answers to any sexually-related question that may arise and how they can protect themselves from STDs. It is highly necessary to teach students, through sex education, how to have safer sex in order to fight STD infections (Rockaway 2003:2). Sex education can also be used to protect young people, prevent teenage pregnancy and inform students about STDs. According to the Public Health Agency of Canada (PHAC, 2003) there are several types of STDs, key among which are the following:

- Chlamydia
- Gonorrhea
- Genital herpes
- Hepatitis B
- Syphilis
- HIV/AIDS

2.2.1 Chlamydia

According to Arnold (2004:67), Chlamydia is a very common bacterial sexually transmitted infection (STI), and is one of the most serious diseases in this category. It can spread silently in females and cause a painful, long term condition called PID (pelvic inflammatory disease) and infertility (an inability to have children). One can get Chlamydia from oral, vaginal and anal sex. According to Macbeth (2001:210), men suffering from Chlamydia can develop scarring of the urethra, making urination difficult and occasionally causing infertility. Although rare, both sexes are at risk of a type of arthritis known as Reiter's Syndrome - an inflammation and swelling caused by the spread of the infection through the bloodstream into the joints.

2.2.2 Gonorrhea

Gonorrhea, a sexually transmitted infection that can cause sterility, is on the rise and growing dangerously resistant to antibiotics. Gonorrhea (also commonly known as "the clap") is a bacterial infection that is transmitted through oral, genital or anal sex with an infected person. It can also be spread from mother to child during birth (ATOD, 2003). ATOD (2003) reveal that the symptoms of Gonorrhea are different in women and men. For example, when first infected, some men will have no symptoms at all. For men who do experience symptoms, these may include:
- A burning sensation when urinating

- Yellowish white discharge from the penis
- Painful or swollen testicles

2.2.3 Genital herpes

Arnold (2004:68) defines genital herpes as a Sexually Transmitted Infection (STI) that can cause painful sores on and around the genital area. There is no cure for the condition, but medication can help ease symptoms. According to the American Medical Depot (2000:146), Genital Herpes is an infection caused by the herpes simplex virus, which causes a painful rash of fluid-filled blisters on the genitals after being transmitted through sexual contact. The AMD reveals that the same family of viruses causes "cold sores" around the mouth. Genital Herpes is mostly spread through direct contact with open sores, usually during sexual intercourse.

2.2.4 Hepatitis B

Chua (2006) defines Hepatitis B as an infection of the liver caused by the virus, and states that it is very easy to get infected with the disease. He reveals that sometimes the infection goes away by itself, while other times people carry the virus for the rest of their lives.

2.2.5 Syphilis

Franklin (2005:134) defines Syphilis as a sexually transmitted bacterial infection that is spread through oral, genital or anal sex with an infected person. A pregnant woman with Syphilis can pass it on to her unborn child, sometimes causing birth defects or death. Although less common, it can also be transmitted through injection (in the case of drug use) or through broken skin on the body.

2.2.6 HIV/AIDS

According to Franklin (2005:135), the Human Immunodeficiency Virus (HIV) is the virus that causes Acquired Immunodeficiency Syndrome (AIDS). HIV attacks the immune system, resulting in a chronic, progressive illness that leaves infected people vulnerable to opportunistic infections and cancers. The median time from infection to AIDS diagnosis now exceeds 10 years. AIDS is fatal - there is no cure. Franklin (2005:135) states that HIV is transmitted through the following:

- Unprotected sexual intercourse (vaginal, anal and oral);
- Shared needles or equipment for injecting drugs;
- Unsterilized needles for tattooing, skin piercing or acupuncture;
- Pregnancy, delivery and breast feeding (from an HIV-infected mother to her infant); and
- Occupational exposure in health care settings.

2.3 Institutional resources, agents or units appropriate for dealing with STDs

According to Kruger (2006), patients in most developing countries have a choice of services from which to seek STD care. The following resources can help students fight the high rate of STD infection on the University of Zululand campus:

- Specialized STD clinics situated on campus
- First level care, including emergency rooms, dispensaries and health-care centres
- Private STD clinics
- Outpatient departments of private hospitals
- Pharmacists (where it is legal to dispense antibiotics without prescription)
- Non-governmental organizations that offer first level care
- Religious societies that provide counseling to students on campus

2.4 Policies and programs appropriate for addressing STDs

Kruger (2006) also posits that the following potential sources can help in the fight against STDs:

- Primary prevention activities (promotion of safer behavior, condom provision, etc) in conjunction with national AIDS programs.
- Promoting accessible, acceptable and effective case management of persons with STDs through public and private health-care systems, including first level health-care using simple algorithms based on syndromes diagnosis.
- Include STD prevention and care services in maternal, child health, antenatal and family planning services or clinics.
- Deliver acceptable and effective STD care services to populations identified as being particularly vulnerable to infection, especially the Human Immunodeficiency Virus (HIV).
- Promote early STD health care seeking behavior together with education related to sexual behavior.

According to Mashego (2004), evidence from case studies suggests that universities in Africa are high risk zones in the transmission of STDs such as HIV/AIDS. 'Sugar daddy' practices (sexual engagement with much older people, usually for material gain), sexual experimentation, prostitution on campus, unprotected casual sex, gender violence, multiple partners, and other high-risk activities are all manifested on campus to a greater or lesser extent (Barnabas, 2003). In the HIV/AIDS context of university life today, the university culture is in danger of affirming risk more than safety. According to Kelly (2001), studies show that STDs (especially HIV/AIDS) are having a

86

serious impact on the economic situation, especially in instances where a student drops his or her studies due to a STD.

2.5 Strategies that can be used by students to prevent STDs

2.5.1 Adoption of healthy sexual behavior

Kruger (2006) believes that overcoming the spread of STDs can be done through open discussion, promoting awareness and balanced mass media messages. The author suggests that a new social norm of healthy social behaviour should be the basis for the long term prevention of STDs. He bases this on the notion that one way or another, all interventions that aim to prevent STDs are partly dependent on, and must be integrated into, healthy behaviour (Diodato, 1997). Despite their current lack of involvement in promoting healthy sexual behaviour, the mass media can be an extremely powerful tool in efforts to prevent STDs by increasing knowledge and changing sexual practices (Diodato, 1997).

2.5.2 Develop strong leadership, strengthen investment and improve information systems for STD prevention

Diodato (1997) argues that in order to build an effective national system, highly visible and strong leadership and support are needed from both the public and private sectors, particularly from elected officials. Diodato further states that among public agencies, the Department of Health and Human Services, particularly the Centre for Disease Control and Prevention, and other state and local health-care departments, have critical leadership roles to play in reducing the spread of STDs in tertiary institutions. According to Annual Reporters (2002), the distribution of information pamphlets, educational documents and other communication material can also help in the fight against the high rate of STD infection.

2.5.3 Design and implement essential STD-related services in innovative ways for adolescents and students

Anderson (2000:82) opines that students require special attention in an effective national system for STD prevention because they are at high risk of acquiring STDs and do not have adequate access to STD-related services. The author adds that the implementation of STD-related services can also be an effective strategy to improve students' knowledge of STDs (Anderson, 2000:86).

2.5.4 Counseling and prevention measures can also fight STDs

Bush (1999) opines that many students who seem to accept the inherent risk of practicing sex with multiple partners inevitably must have a moment of reflection where they will think of the remote possibility that they have contracted a Sexually Transmitted Disease. He suggests that many

students don't believe that counseling can help in the fight against the spread of STDs. Counseling and seeking out information about preventative measures can help society realize the importance of practicing safe sex, thus reducing the incidence of STD infection (Babson, 2006). Babson (2006) further believes that although sexual awareness seems to be a useless tool to most young people, it is a recommended strategy in the fight against STDs in any given community. The author therefore suggests that colleges and universities that are severely affected by the high prevalence of STDs should urgently set up centers that offer counseling and educate students and society about preventive measures and living with STDs.

2.5.5 The involvement of churches

In the South African context, churches have an extraordinary influence on behavior, and their appeals for abstinence before marriage and monogamous union thereafter appear to have significant resonance and strong support on the University of Zululand campus.

According to George (1999:190), churches on campus need to be "brought into the fold" so that they too can examine the ways in which they can contribute towards efforts to address gender-related issues and students' sexual behavior. Churches need to be informed about the STD situation, particularly as to how it relates to the risks on campus. The issue of condom use is, of course, contentious, but churches themselves have to come up with formulae that not only meet their collective conscience and theological requirements, but also the reality of the situation and the need for a loving, compassionate response that does not alienate or marginalize individuals.

3. Research methodology

This study employed both quantitative and qualitative research methods. The main data collection instrument used in this study was a survey questionnaire. Forty questionnaires were handed out to students and thirty five were returned. Of the 40, some did not answer and others were not present when the questionnaires were collected. Collections were done after three days. There were also three questionnaires that were distributed to the organizations found on campus, i.e. the campus clinics, the library, and the Centre for Guardians and Carriers (C.G.C).

4. Results and discussion of findings

This section deals with the analysis of data based on the 35 students' responses.

4.1. Gender (Question 1)

Table 1: Gender distribution. N = 35

Gender	Total number = 35	%
Male	22	62%
Female	13	38%
Total	35	100%

Of the 35 respondents, 22 (62%) were male and 13 (38%) were female.

4.2. Level of study (Question 2)

The aim of this question was to determine the students' level of study, as this could possibly give an indication of whether more senior students were better informed about STDs than junior students. Of the 35 respondents, 32 (91%) were undergraduates while 3 (9%) were postgraduates (see Table 2 below).

Table 2: Level of study of students. N=35

Level of study	Total number = 35	%
Undergraduates	32	91%
Postgraduates	3	9%
Total	35	100%

4.3. Awareness of STDs (Question 3)

Table 3: Awareness of STDs. N=35

Awareness of STDs	No.	%
Yes	31	89
No	4	11
Total	35	100

The aim of this question was to determine whether students know what STDs are. The responses indicate that most students know about STDs.

31 (89%) respondents were aware of STDs, whilst 4 (11%) of the respondents indicated that they were not aware.

4.4. Types of STDs (Question 4)

This question aimed to discover what types of STDs students at the university are aware of.

Chart 1: Types of STDs. N=35
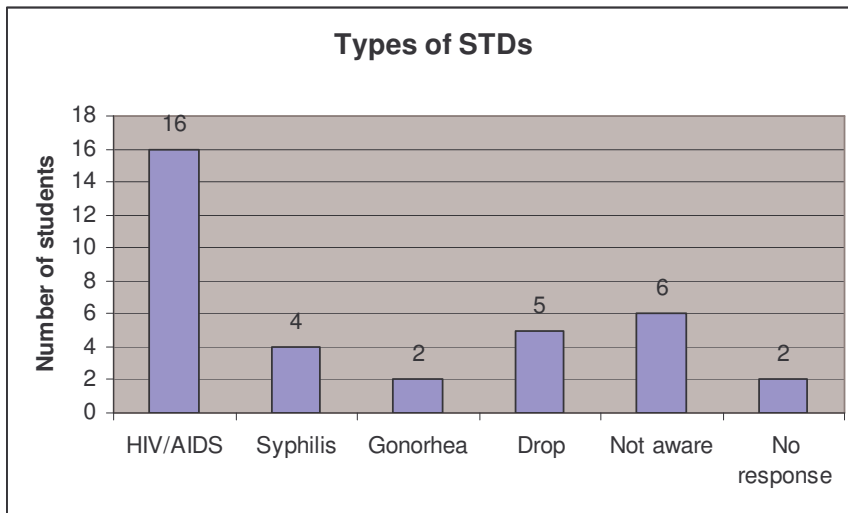
Of the 35 respondents, 16 (46%) were aware of HIV/AIDS, 4 (11%) were aware of Syphilis, 2 (6%) knew about Gonorrhea, 5 (14%) were aware of drop, 6 (17%) were not aware of any STDs, and 2 (6%) gave no response.

4.5. Causes of STDs (Question 5)

Chart 2: Causes of STDs. N=35

90
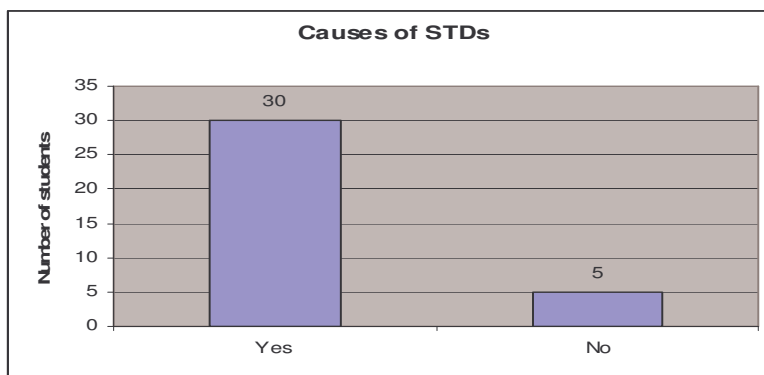
The aim of this question was to find out if respondents know the causes of STDs. 30 (85%) of the respondents claimed to know what the causes of STDs are, and only 5 (15%) stated that they do not know the causes of STDs. The majority therefore [appear] to know the causes of STDs.

4.6. Knowledge of what happens if STDs are left untreated (Question 6)

Table 4: Knowledge of what happens if a STD is not treated. N=35

Untreated STDs	No.	%
Yes	27	77
No	8	23
Total	35	100

This question aimed to find out if students know what is likely to happen to one if a Sexually Transmitted Disease is left untreated. 27 (77%) respondents stated that they know what is likely to happen, while 8 (23%) said that they did not know what the likely consequences are.

4.7. Information provision - prevention aid (Question 7)

Table 4: Information provision - prevention aid. N=35

Information on STDs	No.	%
Yes	29	83
No	6	17
Total	35	100

This question was asked in order to get views from students as to whether receiving information on STDs and their prevention would help them become knowledgeable enough to take the necessary precautions and prevent them from contracting STDs. 29 (83%) of the respondents stated that receiving information on STDs and prevention would help them a lot, while 6 (17%) did not think so.

4.8. Type of information on STDs needed (Question 8)

Chart 3: Type of STDs. N=35
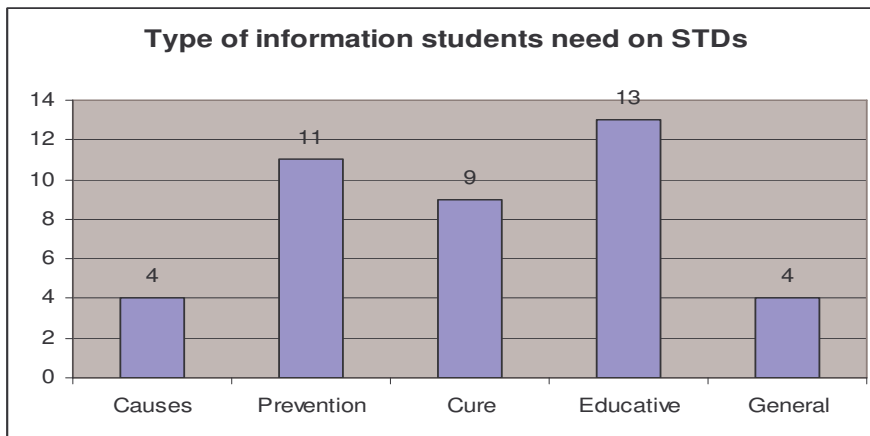
In this question, the aim was to find out what type of information students need on STDs. Only 4 respondents were interested in learning about the causes of STDs; 11 were interested in talking about prevention, 9 wished to know how STDs can be cured, 13 wished to be educated about STDs, and 4 wanted only general information about STDs. Clearly, more students need to be educated or taught about STDs at the University of Zululand.

4.9. Availability of STD information sources on campus (Question 9)

Table 5: STD sources at UNIZULU. N=35

STD information sources availability	No.	%
Yes	20	57
No	15	43
Total	35	100

It was then necessary to find out whether students are aware of the STD information sources and services available on campus. 20 (57%) respondents acknowledged that information sources and services are available on campus, while 15 (43%) declared that information sources and services are not available on campus.

4.10. Information sources used by students (Question 10)

92

Chart 4: Information sources used by students. N=35

Information sources which students use
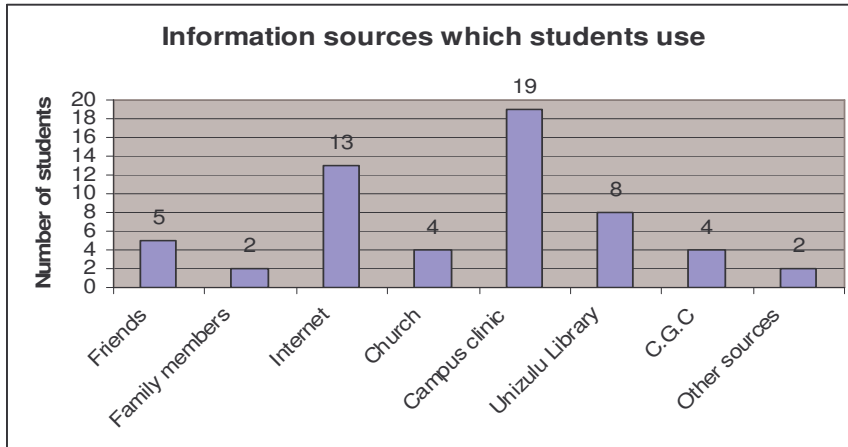
The aim of this question was to find out what information sources and services students use if they wish to get information about STDs. 5 (14%) declared that they got information on STDs from friends, 2 (5%) got information from family members, 13 (37%) respondents used the Internet to get information, 4 (11%) got information from churches, 19 (54%) used the campus clinic, 8 (23%) preferred to use the university library, 4 (11%) chose the C.G.C as the best place to get information, and 2 (5%) preferred to use other sources to get information

4.11 Why some information sources are preferred by students (Question 11)

The results to this question were as follows:
- 4 (11%) revealed that friends are preferable because they are (more) open and caring when talking about STDs.
- 4 (11%) claimed that family members are trustworthy enough to provide counseling about STDs.
- 7 (20%) claimed that the Internet is preferable because it has a lot of information about STDs.
- 1 (2%) stated that the church is the best place to receive counseling about STDs.
- 11 (31%) respondents revealed that the campus clinic is the best place to go for counseling because the nurses are well trained and are highly informative about STDs.
- 3 (8%) respondents argued that the library is a better source because all the students have access to information sources that offer information about STDs.
- 2 (5%) claimed that the C.G.C is the best source because students can talk face to face with a counselor who knows about STDs.
- 3 (8%) never gave a response to this question.

93

It is clear that most students prefer to use the university clinic to meet their information requirements on STDs.

4.12. Use of information sources in order to get information on STDs (Question 12)

Table 7: Information sources used. N=35

Respondent	Total number	%
Yes	17	49
No	18	51
Total	35	100

The intention of this question was to find out if the respondent has ever used any information source/service to gain more information on STDs. 17 (49%) of the respondents acknowledged that they have used some of the above sources to gain information on STDs, while 18 (51%) claimed to have never used any information sources to get information about STDs.

4.13 STDs' information resources used by students (Question 13)

Chart 5: STDs' information resources. N=35
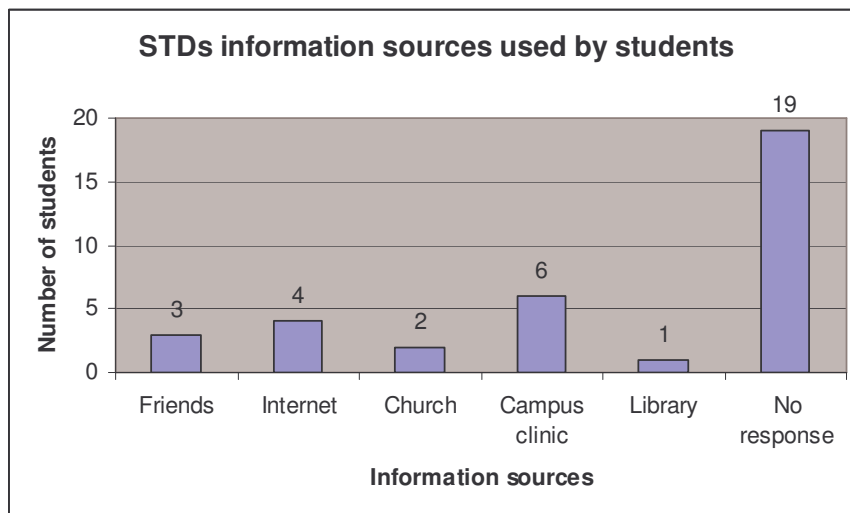
It was then necessary to find out which information sources and services students have used before. Of the 35 respondents, 3 (8%) declared that they have received information from friends about STDs, 4 (12%) stated

94

that they used the Internet, 2 (5%) revealed that they had used the church as their information source, 6 (17%) revealed that they have used the campus clinic as an information source, 1 (3%) stated that they used the library, and 19 (55%) gave no response.

4.14. Format that one would use to get information on STDs (Question 14)

Table 8: Potential format used

Format to be used	Total number	%
Print	8	23
Orally	9	26
Visually	8	23
Posters	15	43
Audio	8	23
Internet	5	4
Other format	1	3

The aim of this question was to find out what format the respondent would prefer when receiving information on STDs. 8 (23%) respondents preferred the information in print form, 9 (26%) preferred oral communication, 8 (23%) stated that information about STDs should be in visual format (for example through the use of television), 15 (43%) felt that posters are the best format, 8 (23%) preferred audio, 4 (4%) argued for the Internet, while 1 (3%) preferred other formats.

4.15 Availability of information about STDs on campus (Question 15)

Table 9: Information about STDs on campus. N=35

Respondent	Total number	%
Yes	15	43
No	20	57
Total	35	100

The purpose of this question was to find out if there is enough information available on campus dealing with STDs. According to the results, 15 (43%) stated that there is enough information on campus, while 20 (57%) believed that there isn't enough information.

4.16 Utilization of the University of Zululand's library in order to get information on STDs (Question 16)

Table 10: Utilization of the library in order to get STD information. N=35

Respondent	Total number	%
Yes	8	23
No	27	77
Total	35	100

This question aimed to find out if the respondent ever used the library to find information on STDs. According to the results, 8 (23%) respondents stated that they have visited the library several times in order to get information, while 27 (77%) stated that they have never used the library to search for information about STDs. We were not able to ascertain why the library is used less.

4.17 Availability of information resources at the library dealing with STDs (Question 17)

Table 11: STD information resources at the library. N=35

Rate of Information sources	Total number	%
Satisfactory	4	11
Not satisfactory	2	6
Not Sure	3	9
No response	26	74
Total	35	100

The intention of this question was to determine the availability of information resources dealing with STDs at the University of Zululand's library. 4 (11%) respondents stated that there is satisfactory information in the library, 2 (6%) claimed that the amount of information is not satisfactory, 3 (9%) stated that they are not sure, and 26 (74%) never responded.

4.18 How to identify and improve access to information sources dealing with STDs (Question 18)

Chart 6: How to identify STDs information sources. N=35

96

How to identify & improve access to information sources in the library collection

No. of respondents

13

8

4 4 2 4

Posters Opac Awareness programs Librarians Workshops No response
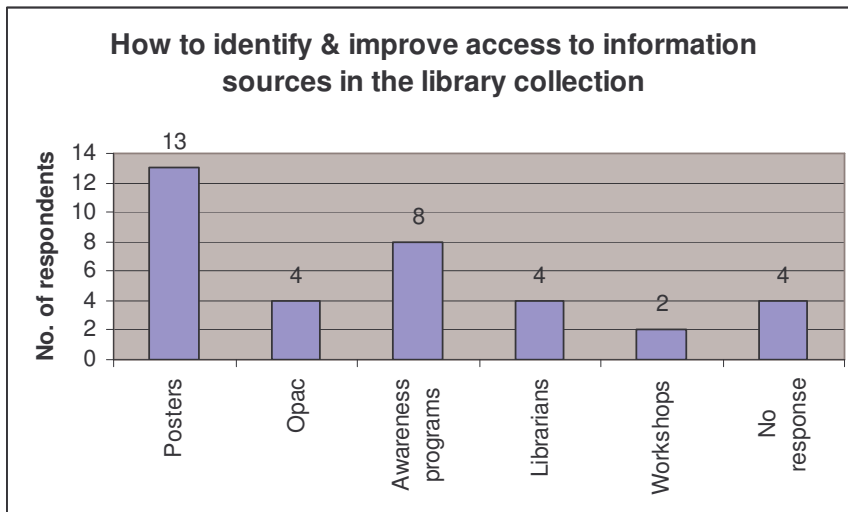
It was then necessary to find out ways that can be used to identify and improve access to information sources that deal with STDs in the library. 13 (37%) respondents stated that posters and the distribution of pamphlets can be used to show students where STDs' sources are located in the library collection; 4 (11%) believed that students must be taught how to use OPAC, which would ease their search for information; 8 (23%) cited awareness programs; 4 (11%) believed that adding and training more librarians would help because students would be able to consult them when in need of assistance; 2 (7%) stated that attending workshops would help improve the library collection; while 4 (11%) never bothered to respond to this question.

4.19 Satisfaction with information on STDs at the Unizul campus (Question 19)

Table 11: STDs information at Unizul. N=35

Respondents	Total number	%
Satisfactory	17	49
Not satisfied	18	51
Total	35	100

The aim of this question was to find out if students are satisfied with the information that is available on STDs on campus. 17 (49%) respondents stated that they were satisfied, while 18 (51%) were not satisfied. There is therefore still more work to be done in terms of supplying, teaching and counseling students about STDs.

97

4.20 How information provision on STDs can be improved on campus (Question 20)

Chart 7: Improving information provision on campus. N=35
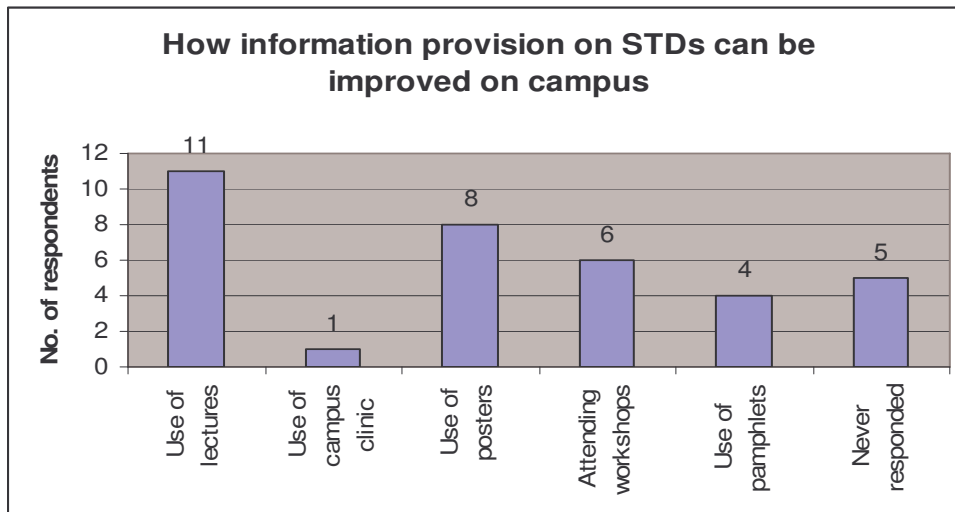
The aim of this question was to find out how information provision on STDs can be improved on campus. 11 (31%) respondents cited lectures, believing that they would inform them about STDs; 1 (3%) stated that students must be encouraged to visit the campus clinic for more information; 8 (23%) believed that the use of posters would help to significantly improve information provision around the campus; 6 (17%) stated that attending workshops would also help academics a lot; 4 (12%) believed in the distribution of pamphlets; and 5 (14%) never bothered to answer this question.

5. Conclusions

This paper has highlighted the need for knowledge and information on STDs for students at the University of Zululand by showing the students' level of awareness of the problem. It is strongly recommended that measures for preventing and dealing with STDs on campus be taken, and necessary resources for information provision, education, testing and counseling be put in place to support preventive interventions.

6. References

Smith, Y. (2001). The importance of education about STDs. 2nd edition. New York: Haworth.

Adams, P. (1993). The impact of Sexual Transmitted diseases among African people. 3rd edition. London. International Thomson Publishing

Djarova, M (2003). "Attitudes of first year tertiary education students towards fertility control" (University of Natal, Masters thesis, Department of Nursing)

Rockaway, H. W (2003) Sexual Transmitted Diseases among academics. 2nd edition. Cambridge: Cambridge University Press.

Arnold, D.Z (2004). Types of STDs and their effects in human health. 5th edition. New York: Haworth.

Macbeth, V (2001). Sexual Transmitted Diseases and social change. *Journal of Information Science*, **22**(5), 205-227.

Atod, M (2003). Sexual Transmitted Diseases: a quantitative approach. New York: Oxford University Press.

Chua, B. (2006). Introduction to New ways of Fighting STIs. In D. Boyarski & W. Kellogg (Eds.), *Proceedings of the DIS 2000 conference on Designing interactive systems: processes, practices, methods, and techniques* (pp. 227-237). New York, NY: ACM Press.

Franklin, Z (2005). Effects caused by Sexual Transmitted Infections. 2nd edition. London. International Thomson Publishing.

Kruger, P (2006). Ways and strategies to be used to fight against the spread of STDs. 4th edition. London. Cambridge: Cambridge University Press.

Mashego, B.E (2004). Perceptions and attitudes on condom use among male and female students of the University of Zululand; Kwadlangezwa. University of Zululand, Department of Psychology.

Barnabas, R (2003) "AIDS education programs on sexual negotiation and condom use", Cambridge: Cambridge University Press.

Kelly, S (2001). How STI can be prevented and increase economy. *New Review of Information Behavior Research*, **3** 12-21.

Diodato, V. (1997). Improving information systems for STD prevention. New York: Haworth.

Anderson, L (2000) "Students' perceptions of the impact of AIDS education programs on sexual negotiation and condom use", Cambridge: Cambridge University Press.

Bush, T (1999). Prevention measures and students behavior towards STDs. 5th edition. Oxford University. International Thomson Publishing.

Babson, V (2006). "Attitudes of first year tertiary education students towards fertility control" (University of Natal, Masters thesis, Department of Nursing)

George, M (1999). Sexual Transmitted Infections. 2nd edition. London. International Thomson Publishing

99

An Investigation into the Effectiveness of ICT Management at the University of Zululand

Restituta Thadeus Mushi[17], Jerry Le Roux[18]

Department of Library and Information science, University of Zululand

3886, South Africa

restymushi@yahoo.com/ restymushi@gmail.com and jleroux@pan.uzulu.ac.za

Abstract

This paper aimed to investigate the effectiveness of Information Communication Technology (ICT) management at the University of Zululand. While many institutions of higher learning, including the University of Zululand, provide ICT facilities for productivity enhancement, most of these facilities are not functioning effectively due to poor persistent management. The sorry state of ICTs in some institutions of higher learning has been a major drawback for the ICT users at such institutions. The study applied both qualitative and quantitative research methods in the form of a descriptive survey through self-administered questionnaires. The questionnaires were distributed to students and academic staff of three selected departments for data collection. 64 questionnaires were distributed and 46 were returned (a return rate of 72%). Due to this low response rate, the main data collection method was backed up by an oral interview. The data was analysed using Microsoft excel 2007, which has effective data analysis functionalities. The findings generally revealed that the effectiveness of ICT management at the University of Zululand is a big issue. Most students and staff members experience difficulties in managing their information because of virus attacks and other security threats, lack of an ICT management policy, and poor bandwidth management.

Key words:
Information, Information Communication Technology; ICT Management; Bandwidth,; ICT Policy; ICT Infrastructure.

1. Introduction

The term Information Communication Technology (ICT) is an umbrella term that covers any communication technology/device (radio, television, cellular phones, computers, networks, hardware, software, satellite systems, etc) and the various services and applications associated with them.

The ICT Department at the University of Zululand (UZ) offers all the necessary services such institutions should offer, such as Internet access, e-mail, intranet, and access to ftp files and http web servers. In addition, they provide support for hardware and software to staff and students, including access to and the maintenance of all computer labs on campus. The ICT unit does not provide or maintain the university website. This is done by the

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[17] Restituta Mushi is final Year Bachelor of Information Science student at the Department of Library and Information Science, University of Zululand, South Africa.

[18] Jerry Le Roux, PhD, is an Associate Professor (also the project supervisor), Department of Library and Information Science, University of Zululand, South Africa

Public Relation (PR) arm of the institution and is hosted on servers outside the university due to on-campus bandwith problems (www.uzulu.ac.za).

2. Aim and objectives of the study

This paper aimed to investigate the effectiveness of ICT management at the University of Zululand. The study's objectives were:

- To determine what ICT facilities are available at the University of Zululand.
- To determine what bandwidth levels should be available at the University of Zululand and what the current status is.
- To determine if the University of Zululand has a policy for the management of its ICT infrastructure.
- To examine factors that influence the effective use of ICT at the University of Zululand.
- To identify appropriate security measures required against unauthorized access to, or alteration, disclosure or destruction of, personal data and against accidental loss or destruction of personal data.
- To identify obstacles faced by staff and students from accessing and using ICTs at the University of Zululand.
- To determine the university's future plans (if any) with regard to its ICT section and its management.
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3. Literature Review

It is widely recognised that ICTs are evolving very rapidly with the introduction of increasingly complex and sophisticated systems in increasingly shorter time intervals. The range of ICT options now available, coupled with the lack of comprehensive ICT management standards, represents a daunting challenge for ICT management. ICT components are increasingly being deployed throughout organizations, which makes the management of such distributed resources both important and difficult. The onus therefore is on ICT management to ensure that these distributed resources that underpin information systems facilitate decision making while also being managed as transparently and as effectively as possible (Great Britain. Office of Government Commerce, 2002:29).

According to Wanyembi, (2002:150) ICT management is based on three equally important pillars:

- funding
- the employment of skilled (qualified and experienced) staff and ongoing training
- Proper infrastructure to meet institutional needs.

101

The effective management of information systems requires adaptation to situational and contingency factors and the constraints in force at any particular time, implying that it must embrace both the theory and the practice of management of ICT to be effective and efficient. Similarly, proper planning, administration and control are essential to ensure that suitable human resources with the right skills and competencies are procured and retained to undertake the necessary roles in infrastructure design and planning (Ropponen and Saarinen in Wanyembi, 2002:20).

Bandwidth

Bandwidth is the amount of traffic or data packets that are allowed to flow between two or more communicating ICT infrastructures. Broadband Internet access is prohibitively expensive in South Africa. The higher education landscape is served by TENET, and areas not covered by its fibre optic network are connected through Telecommunication lines [TELKOM] (FINDMYHOSTING: 2002). This is a highly unsatisfactory arrangement in terms of cost and data speed.

ICT Policy in Institutions of Higher Learning

Institutions of higher learning are generally high-end users of ICT services and infrastructure. These institutions have to ensure secure and relatively fast access to the Internet to provide suitable electronic access and services (such as e-learning) to students (UNAM, 2003:20).

ICTs in Higher Education. What are the benefits?

ICT has been known to improve students learning as it facilitates improved motivation, learning by trial and error and practical experience, self-paced learning, concretisation of abstract concepts, and better retention of lessons (Gunasekaran, McNeil and Shaul, 2002:2). According to UNDP, (2001), ICT-mediated learning can facilitate sophisticated and customised performance simulation suitable for vocational training programmes, e.g.:

- User satisfaction derived from higher ICT utilization, exploitation and maintenance
- Higher productivity levels derived from ICT utilization, exploitation and maintenance
- Higher levels of achievement of universities objectives (Wanyembi, 2002:148)

ICT Infrastructure

Majanja, (2004:176) illustrates that ICT infrastructure covers all aspects of technology and services that make organizations able to meet the set goals. This involves the planning of architecture; the tendering process; testing, installation, integration and commissioning of architecture; ongoing support; and the maintenance of the ICT components and services. Majanja

further adds that although basic ICT infrastructure constitutes the foundation upon which ICT is used, there is a need for the sufficient development of infrastructure that would enhance the installation of equipment and carrier technology, functionality, accessibility and operating systems for the success or failure of implementing ICT strategies.

ICT in Research

Research information and research communication are two academic research aspects that heavily rely on ICTs (UNDP, 2001). The development of scientific research networks on a global basis using the Internet has helped to empower research programmes, even in developing countries, and research processes in higher education have been enhanced by the ICT environment, which has enabled researchers to co-ordinate research information and collaborate in research activities (Shermatov, 2004:7).

ICT in Teaching and Learning: the Case for e-Learning

Morales & Roin, (2002:256) explain that the integration of new technology in teaching and learning is a significant factor in the promotion of academic innovation and transformation, hence influencing the teaching and learning paradigm. The authors further posit that this teaching and learning paradigm requires university professors or lecturers to have skills in instructional technology in addition to their subject matters expertise. Majanja (2004:63) explains that academic staff need to be cognisant of the use a variety of learning styles, such as active learning, learning to learn, collaborative learning, problem-solving, role playing, etc; which are easily facilitated by ICTs.

4. Using ICTs at the University of Zululand

The labour market today requires extensive computer literacy, which involves specific ICT skills such as the online searching and retrieval of information. Universities like the University of Zululand are at the forefront of this development. Many universities have serious problems relating to their ICT infrastructure, skills and other resources (Amutabi, 2004:1). The University of Zululand is no exception to this.

The lack of trained and experienced personnel to control and maintain the increasingly large numbers of ICT resources means that their effectiveness and efficiency cannot be maintained. According to Amutabi, (2004:18), university lecturers need to be prepared in terms of ICT instrumentation and management to enhance their medium of instruction and training. Kaplan and Owings in Amutabi (2004:13) define lecturer quality according to two broad areas, namely lecturer preparation or qualifications, and teaching practices.

Information on the use of ICTs at the University of Zululand is not well documented; therefore there are many questions that are still emerging as to whether there is adequate capacity among the staff and students to effectively and legally use ICT services.

In contrast to the University of Zululand, most universities in South Africa are connected to the Internet via a fibre optic link provided by the Tertiary Education Network (TENET). TENET, founded in August 2000, is a Section 21 organisation jointly run and managed by the Committee of Technical Principals (CTP) and the South African Universities Vice-Chancellor's Association (SAUVCA).

The two bodies have since merged into "Higher Education South Africa" (HESA), where the main purpose of TENET has been to secure the benefits of Internet and information technology for South African universities over the past seven years. According to Le Roux, (2005:62), the University of Zululand is far behind in terms of distributed learning and high-speed access to the Internet. The university has one of the lowest bandwidths of all the universities in the country. This has a detrimental effect on distributed teaching and learning, particularly e-learning. Although one could argue that Le Roux's arguments are skewed in favour of the better financed universities in South Africa, there is no reason why the University of Zululand should not be able to compare itself with its counterparts, like the Walter Sisulu University (former Transkei), which has 7 MEG bandwidth. The University of Zululand currently has only 1.928 MEG on tap. This is totally insufficient for an institution with more than 10358 registered students and 700 staff members, and with 7 computer laboratories.

5. Research Design and Methodology
Target population

According to Bless & Higson-Smith (2000:84), a population is the set of objects or people that is to be used to determine some characteristics in a study. Neuman (2006:224) contends that the target population as a large pool of cases or elements, which can be persons, groups of people, or organisations. The target population of this study was the academic staff selected from three Departments, namely: Library and Information Science, Computer Science, and Communication Science. Students were also sampled from the above selected departments. In addition, the study focused on the network service staff (of information and communication technologies) at the University of Zululand. Because it is not practical or possible to study an entire population, it is necessary to make general findings based on a study of only a subset of the population, called samples (Goddard and Melville 2001 in

Oluwafemi 2008:75) Moreover, the sub samples selected in this study give the highest number of the true uses of ICT infrastructure in the university.

Sampling

Neuman (2006:219) defines a sample as a smaller set of cases a researcher selects from a large pool and generalizes onto the population. The sampling approach can be categorised into two groups, namely probability and non- probability sampling. In this study, non-probability sampling was used. Specifically, purposive sampling, a derivative of non-probability sampling, was applied. Purposive sampling was chosen because it has the advantage of eliminating excessive inaccuracies stemming from the unsuitability of a sample to have the target qualities of the population under review. According to Neuman (2006:222), purposive sampling is a valuable kind of sampling for special situations, particularly in exploratory research or in field research. This study used purposive sampling to first select three departments out of the total 48 at the University of Zululand, the criterion being that these three departments use ICT more than others. To complement this, another non-probability sampling method, namely quota sampling, was chosen to select staff and students from the three departments that were purposively selected for this study. Noak (2005:37-39) explains that quota sampling attempts to create a representative sample by specifying quotas, or targets of a particular type of people that need to be included in the sampling frame to represent the population. Neuman (2006: 221) also adds that quota sampling is a non-random sample in which the researcher first identifies general categories into which cases or people will be selected, before selecting cases to reach a predetermined number of cases in each category. Applying quota sampling has ensured that there are some differences in the sample used in this research. Quota sampling was used to choose 21 staff and 49 students from the three departments that were selected purposively.

Sampling Frame

According Neuman (2006:225), a sample frame is a list of cases in a population, and a good sample frame is crucial in a good sampling process. Bless and Higson-Smith (2000:86) have also stated that the best way to ensure a representative sample is through the use of a complete and correct sampling frame. They further add that an inadequate sampling frame that discards parts of the target population has been the cause of many poor research results. Table 1 shows the target population for this study. The sample frame consists of 10 ICT staff members, 162 registered students, and 20 academic staff.

Table1: Sampling frame

105

Department	Staff	Students
Library and Information Science	5	49
Communication Science	5	60
Computer Science	10	53
ICT Department	10	
Total	30	162

Sample Size

According to Leedy and Ormrod (2005:207) the size of an adequate sample depends on the homogeneity of the population. If the population is markedly homogenous, a larger sample will be necessary than if the population is fairly heterogeneous. Gay and Airasian in Leedy and Ormrod, (2005:207) offered the following guidelines for selecting a sample size: i) For a small population (with fewer than 100 people or other units) there is a need to survey the entire population; ii) If the population size is around 1, 500, a sample of 20 % is recommended; and iii) A sample that is beyond 5,000 units or more in terms of its population size is almost irrelevant, and a sample size of 400 should be adequate. In this study a sample size of 70 from the total population of 10358 registered students, 20 academic staff, and 10 ICT staff was used. A sample of 40 registered students was drawn from the sample frame of 162. For both the academic staff and the ICT staff, the sizes were seen to be manageable and as a result no sample was drawn. Of the 70 sampled, a total of 46 responded, i.e. 33 students, 12 academic staff and 1 ICT staff member. The selection of the sample size was based on Gay in Oluwafemi (2008:125) guidelines, which denoted that the larger the population size, the smaller the percentage of the population needed to get a representative sample. The sample size population approximated the qualities and characteristics of the general population (Oluwafemi 2008:256).

Data Collection Instruments and techniques

The main body of this research consists of a survey interview that involved a questionnaire. The questionnaires were designed and distributed to students, academic staff, and ICT staff. Although the respondents were not as prompt as expected, 70 % were received by May the 25th, 2008. According to Cross and Jones (2001:49), data is the term used to refer to the facts that require processing to produce useful information. Data collection is the process of collecting data that will be analyzed. Aina (2002:63) mentions that data collection instruments include questionnaires, interviews and observation. According to Aina (2002:63), a questionnaire as a data collection

instrument consists of a set of questions for submission to a number of respondents in order to gather data. He further explains that questionnaires are generally categorized as close-ended or structured and open-ended or unstructured questionnaires. In this research, questionnaires and interview schedules were used as the main data collection instruments.

Neuman (2006:287) defines a close-ended questionnaire as a type of survey research question in which respondents must choose from a fixed set of answers. According to Neuman (2006:286), an open-ended questionnaire is a type of survey research question in which respondents are free to offer any answer they wish to the question. An interview was also used for the ICT Department at the University of Zululand. Goddard and Melville (2001: 49) state that an interview involves one-on-one verbal interaction between the researcher and a respondent.

6. Results
This section comprises six sub-sections.
6.1. Information on ICT usage
When respondents were asked which ICT facility they mostly use, the majority of the respondents (29; 35%), said they use the computer. Only 2 (2%) said that they use fax machines, while 2 (2%) cited cell phones and scanners. The high use of computers significantly impacts on the use of Internet services (22; 27%), the telephone (13; 16%) and the printer 15(18%), where the latter is an important component of ICT hardware.

Most students use the printer to produce a hard copy of their typed Microsoft Word documents (mostly assignments), which are then submitted to their respective departmental lecturers. When the academic staff was asked to state which ICT facilities they mostly use, 12 (27%) cited computers; 11(24 %) said the Internet, 9 (20%) printers; 8 (18%) cited the telephone; 3 (7 %) said fax machines, while 2 (4%) cited the scanner. The results are a demonstration that the ICT facilities at the university are not adequate, and each academic staff member seems to have been citing either the facilities they don't have or those that have problems and have not been repaired or replaced by the university.

6.2. The management of ICT facilities at the University of Zululand
When respondents were asked their opinion in terms of the management of ICT facilities at the University of Zululand, an overwhelming majority 11 (92%) of the academic staff answered that there is ineffective management of ICTs. Only 1 (8 %) did not answer the question. 26 (79 %)

107

students said there is ineffective management of ICT facilities, 6 (18 %) said yes and 1 (3 %) did not respond to this question.

The reasons cited for the ineffective management of ICT facilities at the University of Zululand are as follows:

- The university should increase network bandwidth to enhance the speed of Internet access.
- They have limited staff; the university should hire private ICT companies, buy more computers and projectors, and make sure the ICT facilities are serviced every month.
- Poor / limited resources.
- Poor response to problem solving (time table).
- Virus threats - the network is not properly managed; if it was, they wouldn't be such viruses.
- When you need help, management is not available, and the management seems to forget the role of the department.
- ICT staff have to share their problems with other qualified staff members so that they can push management to discuss the matter at the university board.

6.3.ICT policies at University of Zululand

When staff were asked if they know of any existing ICT policy at the University of Zululand, 11 (92%) said no and 1 (8%) said yes, which is a huge disparity when compared to responses from the academic staff. It is interesting to observe that 26 (79%) of the students respondents said they have no idea of the existing of an ICT policy and 2 (21%). Although most staff members cited having knowledge of the existing policy, none was able to place the authorship of the policy, and no document with regard to the policy could be produced. One respondent from the academic staff confirmed this when he said that he did not know where they are and who has them. This could mean that some of the staff are imagining that there is a policy when in actual fact one does not exist. Furthermore, 7 (21 %) of those who said they are aware of an ICT policy stated that these policies can be found on the notice boards, while one (1) respondent said that policies are not published to increase students' awareness of them. From the results, it is clear that although the university might have an ICT policy in place, it is not clear to the majority of the students and staff members.

6.4.Limitations on the effective use of ICT facilities at the University of Zululand

Twenty two (24%) students indicated that there are slow Internet connections, while 19 (21%) indicated poor network connectivity. 18 (20%) cited virus problems, while 13 (14%) said there are strict rules and regulations guiding the use of the facilities. The poor responses to problem solving when one has an ICT problem was cited by 11 (12%). In the findings

108

from academic staff, 10 (26%) indicated slow Internet connections; 10 (26%) cited poor network connectivity; 8 (1%) indicated viruses; 4 (10%) indicated poor responses to problem solving by ICT staff; 4 (10%) indicated poor / limited availability of resources; 2 (5%) cited strict rules and regulations guiding the use of the facilities; and 1 (3%) did not answer this question.

6.5. To what extent do computer viruses affect the use of ICTs at the University of Zululand

From the findings, 8 (67%) academic staff indicated that the extent is very high; 3 (25%) said it is limited; and 1 (8%) said not at all. The results show clearly that viruses are a major problem at the University of Zululand. An overwhelming number of students (27; 85 %) indicated that the problems with viruses are very high, while 4 (12%) cited the virus problem as limited. Only 1 (3%) respondent had no problem with viruses. The interview with the academic staff member who said she never experienced viruses revealed that she bought her own anti-viruses to avoid the chaos in the ICT Department.

6.6. Satisfaction with the level of service offered by the ICT Department

Five (42%) of the staff indicated minimum satisfaction with services, 4 (33%) said they are averagely satisfied, and 3 (25%) said that they are not satisfied. The level of satisfaction seems to be relatively low, as none cited having high levels of satisfaction (as should be the case in an institution of higher learning). In terms of the students' level of satisfaction with the ICT services offered by the ICT Department at the University of Zululand, 17 (52%) indicated that they are averagely satisfied; 11 (33 %) are not satisfied; 3 (9%) indicated minimum satisfaction; and only 2 (6%) ascribed to being highly satisfied. Commenting on their level of satisfaction, students suggested that the ICT Department and university management should act quickly when it comes to fixing PC problems, since most students really find themselves inconvenienced when the university takes longer than two to three terms to solve a single problem

6.7. Security of personal student information, for example students results on webreg.uz

Table 1 below presents the perceptions of respondents with regard to the security of personal data at the University of Zululand. The findings show that 5 (42%) of the academic staff said that they are not sure if their personal data is secure; 4 (33%) believed that their personal data is secure, and 3 (25 %) said their personal data is not secure. The results cast doubt on the overall security of data and staff records. The students perceptions of the level of

109

security of their personal data through the use of the personal web registration indicate that the majority of the students (29; 88%) perceive their personal data to be secure, while only a small number 4 (12%) have confidence in the security of their data.

Table 1: Security of personal data

	Students		Staff	
	Frequency	%	Frequency	%
Yes	4	12%	4	33%
No	29	88%	3	25%
Not sure	0	0%	5	42%
Total	33	100%	12	100%

6.8. What can be done to improve ICT infrastructure at the University of Zululand.

The academic staff and students cited several strategies in regard to the improvement of ICT infrastructures at University of Zululand. They suggested the need to:

- Invest in human capital and improve ICT infrastructure, including higher bandwidth procurement
- Train staff to manage the computer networks
- Check if all faults are attended to by management, who need to pay more attention to the timetable
- Hire outsiders with more experience and qualifications than our ICT staff
- The university should provide new ICT facilities and increase Internet connectivity as well
- Currently, the university should make registration online rather than what is happening
- Training users to safely use ICT should be a continuous activity for effective ICT.
- Implementation of new strategy by a newly appointed ICT director to ensure the implementation of ICT at te University of Zululand
- Establish easy communication between the management of ICT and the University of Zululand council in terms of ICT usage
- The department should make the ICT policy available to the entire University of Zululand community, because as it is now, only the ICT department knows it well
- To have enough ICT facilities and to make sure that they are working
- The department has to update software regularly
- Upgrading of hardware/software regularly, using effective anti-virus software, etc.

- Each Department should have their own computer laboratories.

Information on existing ICT policies and regulations

More than three drafts of an ICT policy have been made, but the management is making its operation and adoption difficult. They are, however, in the process of writing a final policy document.

Bandwidth management at the University of Zululand

According to the interview with the ICT staff member, the University of Zululand's bandwidth is very small due to budget restrictions. There is also a large number of registered students and staff who use the Internet daily, which also leads to bottlenecks in our network.

Major problems effecting ICT services at the University of Zululand

In the interview, the respondent pointed out that funding shortages and poor management are major problems. The respondent also cited the need to invest in ICT software and hardware, which requires a lot of money, as well as employing new staff as important components in the facilitation of the effective management of ICTs at the University of Zululand

Future plans for ICTs at the University of Zululand

The interview sought to determine any future plans relating to ICT developments at the University of Zululand. The respondent from the ICT Department presented the following views:
- The ICT Department is in a process of getting more staff, especially for desktop support
- They are trying to upgrade software and hardware as well as test for good packages which they will present to the management, who will agree on whether or not to adopt
- They are looking for an anti-virus package that will work, but a general solution is not available because viruses develop daily

Conclusions and Recommndations

Generally, the results show that the available ICT facilities range from personal computers, to Internet services, printers, telephones, scanners and fax machines. These facilities are highly overstretched because of the large number of students and staff members making use of them.

The amount of bandwidth availed to institutions of higher learning is determined by their network connections, both internal to their data centre and external to the public Internet. Historically, when ICT professionals would refer to the services that they provide, they would be referring to bandwidth, frame relay, fast Ethernet or server specifications. A more recent focus area has been the management of bandwidth resources.

The results have demonstrated that the UZ's bandwidth is inadequate for the effective provision of the much anticipated services required by both students and academic staff for research. It is estimated that the university's bandwidth is ten times lower than the bandwidth found in other institutions of higher learning. Slow Internet connections and freezing/crashing personal computers are at times said to be caused by the low bandwidth.

The literature reviewed has demonstrated that a good policy provides a good framework for ICT development and use in any organization or institution, particularly in areas of strategic implementation, staff development and communication. **The results show that while most academic staff members cited the existence of an ICT policy, many students stated that they have no knowledge of it.** The interviewed ICT staff member also cited frustrations within management in putting in place an ICT policy. This, in the researcher's view, has been responsible for some aspects of the poor implementation of ICT facilities at the university.

The findings revealed that in order to achieve effective management in the use of ICT facilities, the UZ must have an effective means of managing ICT-related risks and be able to implement security policies and procedures based on their ICT risk exposure.

It was found that there is no application of ICT security management in the overall process of establishing adequate ICT security within the institution in order to achieve and maintain appropriate levels of confidentiality, integrity, and availability of information and services at the UZ. In the researcher's view, this is an area that requires immediate and further investigation. It is likely that the current state of ICT security at the university has led to many instances of lost data, disclosure of personal information, destruction of personal data, and virus infections - factors that create problems and raise doubts as to the sustainability of ICT in fulfilling the goals of institutions of higher learning. Security procedures at the University of Zululand need to be regularly reviewed by the computer centre or ICT Department. This can only be achieved when there are qualified personnel on the ground.

Thus, the results have revealed that computer viruses, poor network connectivity, a shortage of ICT staff and lack of ICT facilities (computers) are the main obstacles in the access and use of ICT facilities. This is further exacerbated by irregular updates and the poor maintenance of computer hardware and software.

The interview with the ICT staff member was rather disappointing because there appeared to be no clear vision or an ICT policy that could act as a guiding framework towards restructuring the ICT Department. The case of

hiring a new director, as proposed by some of the interviewees, may also not work unless ethics and qualifications come into play and the university management provides a supportive framework.

Generally, after going through various background theories and methodologies on information management, it would appear that as of yet, there are no immediate solutions to the problems.

Recommendations

1. ICT resources and their management at the university require vast improvement. ICT's management needs to integrate and incorporate ICT policies that would facilitate and guide the development and use of ICTs. The university's ICT management team should also ensure sustained funding, provide appropriate equipment, and improve expertise in order to develop a clear vision of the ICT services on offer at the university.

2. A policy document is important, not only as a blueprint for expected development and action, but also as a basis and framework for negotiation, collaboration, and the sharing of services with other institutions. ICT policies can also help address tough and unexpected problems. It therefore follows that the university needs to have an ICT policy in place.

3. There is a need for confidentiality in order to ensure that information is accessible only to those authorized to have access. It is recommended in this study that the university should block the webreg program, as many students and staff are not happy with it. Novell or ITS, on the other hand, needs to be strengthened.

4. Inadequate ICT infrastructure, both for staff and students, affects Internet connectivity, information flow and general access to the full range and power of ICTs. The university should increase or allocate enough funds for bandwidth management. It is highly recommended that the technical support staff get intensive skills training. More generally, management should always ensure that it employs qualified and skilled personnel.

5. The ICT Department should immediately respond to all faults reported to them by both students and staff.

References

Aina, L.O (ed) (2002).*Research in Information Science: An African Perspective*. Gaborone : University of Botswana

Amutabi M.N. (2004).Prospects and dilemmas of Information and communication technology (ICT) in University Education in Africa: The case of Kenya. University of Illinois.USA.

Babbie,E.(2007).The practice of social Research (11th ed.) Belmont: Thomson / Wadsworth

Bakari, J.K. (2005). *Towards A Holistic Approach For Managing ICTs Security in Developing Countries.* A Case Study of Tanzania. Stockholm University and

Royal Institute of technology. Accessed on 12 April 2008 from EBSCOhost databases.Bandwidth management. (2002).Accessed on 16th April 2008 from FINDMYHOSTING website http://www.findmyhosting.com/bandwidth.htm

Bless C. and Higson - Smith C. (2000).*Fundamental of Social Research Methods*: An African Perspective.3rd edition. Lusaka: JUTA

Goddard, W. and Melville, S 2001.*Research Methodology: An Introduction.*2nd edition. Lansdowne :JUTA

Great Britain. Office of Government Commerce (2002). *Best Practice for ICT infrastructure management.* Accessed on 20th May 2008 at: http://books.google.co.za/books? London: TSO.

Oluwafemi, T. Esther. O. (2008). *The effectiveness of the broadcasting media as an argent of social transformation in the society: A case study of the impact of South African Broadcasting Corporation on Esikhawini Township: KwaZulu- Natal.* Unpublished Master's Thesis.

University of Zululand.

Ikoja Odongo, J.R. 20004. *A study of Information and uses of the informal sector of Uganda* Vol.2. . Unpublished Doctoral Thesis, University of Zululand.

SADC Ambassadors build their ICT skills: Accessed on 1st May 2008 at www.uneca.org/std/news/ ICT policy

The University of Namibia (2003): *information and communication technology (ICT) strategy* / compiled by G.E. Kiangi ... et al..

UDNP (2001).*Creating a development dynamic final report of the digital opportunity initiative.* Accessed on 25th April 2008 at **http://www.opt-init.org/framework**

UNECA.2007. *South African stakeholders assess the use of ICTs in facilitating trade*: accessed on 1st May 2008 at www.uneca.org/std/news/ ICT policy Expo- Dlamini- EN.ppt

Venter P. L.(2005). *Achieving business objectives by means of effective ICTs service level management.* TShwane University of Technology. Accessed on 2th May 2008 from EBSCOhost database

Wanyembi, G (2007). *Application of a model for improving ICT management: a case study International Academy of Information*

Management, Delft   University. Accessed on 25th March 2008 from EBSCOhost database.

Wanyembi, G.N. W (2002). *Improving ICT Management in Public Universities in   Kenya.* geboren te Bungoma, Kenia. Accessed on 25th   March 2008 from   EBSCO host database.

Shermatov,S. (2004). *ICT Development in Uzbekistan*. Bangkok,   Thailand.   Accessed on 27th May 2008 at <u>www.ddi.uz</u>

Research Challenges and Opportunities in a Digital Dispensation: An African Perspective

Stephen Mutula[19]- smutula@hotmail.com
Department of Information Science
University of Zululand

Abstract

Universities the world over are expected to undertake research and generate and publish results that can be widely interrogated, improved upon, shared and applied for enhanced national and international development. The digital era affords great opportunities as well as challenges for enhancing research, especially in university environments. Opportunities include the wider dissemination of research findings; enhanced visibility of the university; immediate access to information by researchers (24/7); collaboration and partnership; sharing of results; short turnaround times and increased output; access to large numbers of respondents; increased channels of publication, and much more. The challenges relate to a lack of research strategies; absence of information repositories; lack of awareness and skills; lack of institutional preparedness; licensing constraints; cost of digital content; poor quality of research output; perceived low quality of Internet sources; information overload; intellectual property restrictions; and the high cost of digital preservation. This paper reviews the challenges and opportunities of doing research in a digital environment, especially from the perspective of African universities, and proffers proposals on how to ameliorate the situation while leveraging ICTs to enhance the research environment.

Keywords: Research; Scientific Communications; Scholarly Publications; Digital Scholarship; Africa

Introduction

The growth in the use of information and communication technology (ICT) in higher education affords university academics and researchers, especially those in developing countries, a unique opportunity to bridge the knowledge gap between them and their counterparts in developed nations. ICT is increasingly being perceived in higher education as crucial to the continued survival of universities and research institutes. The World Bank's 1998/99 World Development Report called for radical changes, including the infusion of ICT in post-secondary education, if Africa is to equip its labour force with the skills needed to survive in the new technological age. Many universities in Africa are acquiring various ICTs for use in teaching and research. However, Adeya (2001) warns that access to ICT does not necessarily lead to immediate application. Hopkins (1996) pointed out that in acquiring [ICTs] universities very often exhibit a blind faith in

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[19] Stephen Mutula,PhD, who delivered a Key Note address at the conference, is a visiting professor in the Department of Library and Information Science (until December 2008), University of Zululand, South Africa. He is currently an Associate Professor at the Department of Information Studies, University of Botswana, Botswana.

technology - a sort of technological determinism - that merely installing a machine will lead to its efficient use. But this is usually not the case, as is increasingly evident in a number of universities in Africa.

The role of universities generally includes knowledge creation; knowledge synthesis and delivery; credentialing (electing/screening students); training scholars; social integration; networking (e.g., faculty, students, alumni, community and business leaders); and supporting communities in a variety of ways (Rangaswamy, 2000). Most research work in higher education is undertaken by faculty and postgraduate students because most universities, colleges and schools that offer graduate education and training require that students write a master's or doctoral thesis/dissertation. Research activities largely involve the provision of professional, technical, administrative or clerical support and/or assistance to staff directly engaged in research and experimental development; management of staff who are engaged in research; and the supervision of students undertaking postgraduate research courses (James Cook University, 2003). Research tests assumptions and observations and creates new knowledge that can be used to improve services. Research also provides the theoretical framework needed to understand the information reported by individual scholars. In the context of LIS, many types of specific research exist, but the two major categories are basic and applied research. Basic research seeks to create new knowledge and is not directly related to technical or practical problems, while applied research seeks to solve the practical problems that library and information scientists face (John Cook University, 2003). Research carries with it a responsibility to disseminate and apply the results of research activity. Consequently, universities the world over are under immense and constant pressure to generate knowledge that can help address problems facing contemporary society. Pressure is exerted on universities in part because they are public organizations funded from public coffers. Consequently, they must demonstrate accountability for the money they receive from government to fund their operations.

Challenges facing researchers, especially in African universities, tend to dominate contemporary research literature. In the context of Africa, for example, literature tends to focus on challenges relating to the descriptive nature of research and the lack of empirical rigor; paucity of cross-disciplinary research endeavors; limited collaboration between practitioners and academics; poor link between research and national development agendas (Moahi, 2007); decreasing state subsidies (Botha and Simelane, 2007); inadequate research expertise and experienced supervisors (Biermann and Jordaan, 2007); the high subscription costs of scholarly journals; language barriers; limited publishing infrastructure; lack of incentives for researchers; inadequate mentoring frameworks; and weak or no partnerships

with government, industry, public, donors, etc (Lor, 1998). However, research challenges and opportunities in the digital dispensation have yet to receive adequate treatment.

Research Quality Indicators

There are various indicators used to measure the quality of research output. The legal profession considers the quality of research in the context of the quality of the researchers. Such researchers should have (The University of Melbourne, 2008): a substantial body of high quality work published over a sustained period of time; a reputation of excellence in their field; and a demonstration of research leadership within university environments. Moreover, researcher excellence may take a number of different paths. Some researchers may aim to primarily influence the academic community and the quality of their work is recognized through academic quality indicators. Others may aim to influence policy and the quality of their work may in part be measured by the impact of outcomes in the public domain.

Quality researchers are also recognized according to a number of other indicators, including but not limited to the publication of a book (or a chapter in a book) by a reputable scholarly body; publication of a scholarly article in leading journals; positive reviews of the researcher's authored or edited books; citations of works by the researcher by leading scholars in the field; and use of the researcher's work by government, industry, etc. Other indicators include: journal editorship; membership in the advisory committees of journals; invitations to speak at conferences, particularly as a preliminary speaker; partnership in research collaborations or research networks; fellowships or honorary positions at other universities; awards or honours for research by government or non-governmental bodies; membership in government, industry, or non-governmental advisory boards where such membership is attributable to research expertise; obtaining competitive external research grants; high levels of successful research supervision of students; leadership role in developing links; and their mentoring role over junior research staff and research students (The University of Melbourne, 2008).

Paradigm Shift in Research Process in Digital Dispensation

The academic environment in universities the world over is undergoing tremendous transformation. This transformation is well captured in the words of Prof. Frank Youngman when he opened a digital scholarship conference at the University of Botswana on December the 12th, 2007. He observed that "the teaching and research work of academic institutions has been based historically on the printed page; libraries with their physical

collections of books, journals and documents have been at the heart of universities; however, academic work is being transformed as the shift takes place from print media such as books to the Internet and digital media including graphics, audio and video. A different kind of student is also emerging ("the iPod generation") with greater computer literacy and different kinds of expectations from the university experience. This transformation has been brought about by globalization and the revolution in technology especially the Internet and World Wide Web" (Youngman, 2007).

Among the transformations taking place in universities, is the increasing trend towards the online delivery of information, with libraries responding by making attempts to digitize material that was once only in print format. This action is necessary to facilitate the delivery of collections to users 24/7 via intranets, the Internet and other fast and emerging networks. Similarly, digital information resources are increasingly being relied on as primary or complementary information sources of scholarship. Scientific journals that were a few years ago produced largely in print form are now rolled out first as e-versions before their prints can appear. Libraries are also transforming their print collections into 'e-collections' through digitization or subscription to e-journals (with or without print alternatives) as a strategy to make them more accessible and to enhance resource sharing.

Opportunities for Research in the Digital Dispensation

The developed world is effectively leveraging ICT to enhance research capacity. The US National Institute of Health (NIH) requires its funded researchers to deposit their final peer-reviewed manuscripts in its online digital archive. The US Congress also requires research supported by major government funding agencies to be freely available online within six months of publication in a journal. In Canada, the Social Sciences and Humanities Research Council operates on the principle of open access, and scholars and publishers are required to make their publications available through open access so that they can be easily and widely accessed (Association of Research Libraries, 2006).

In the UK, the biomedical research funding agency requires recipients of research grants to submit an electronic copy of the final manuscripts of their research papers into its electronic archive. Similarly, the European Union has implemented policies requiring grantees to deposit journal articles and conference proceedings in open online archives. The German Research Foundation (DFG) expects the research results it funds to be published and made available digitally and on the Internet via open access (Association of Research Libraries, 2006). In Africa, although some attempts are being made by universities to place their research output online, most universities are yet

119

to use ICT effectively to enhance the research process. Among the institutions that are making good progress in their attempts to provide their research outputs online are Rhodes University (online theses and dissertations), the University of the Western Cape (institutional repository), University of Pretoria (institutional repository), and the University of Botswana (institutional repository).

Doing research in the digital environment has a number of benefits. For one, it boosts the visibility of universities on the Web and enhances their competitiveness. It also enables researchers to know what their global counterparts are doing, thus enhancing collaboration and the sharing of knowledge and best practices. By seeing what others are doing, it becomes possible to reduce the duplication of research efforts. Research in the digital environment can also facilitate access to a wide range of literature housed in electronic databases, digital libraries and the institutional repositories of other universities, and consequently help address the dearth of information resources that universities in Africa are faced with. The use of ICTs enhances output as well as accuracy because of the increased use of computers. Through digital scholarship, it is possible for universities to:

- Enhance quality research.
- Make contributions to global knowledge.
- Enhance content development.
- Help bridge the knowledge gap between the north and south.
- Provide access for greater numbers of students to higher education.
- Make access to higher education more democratic and liberalized.

The digital environment enables universities to provide e-learning - the use of a variety of information and communication technologies to facilitate student-oriented, active and open, life-long learning (University of Botswana, 2001) - to enhance classroom teaching and improve the quality of research (Department of Education and Youth Affairs, 2001). Through e-learning, group work, self-directed learning, and the maintenance of students electronic portfolios of their work (Livingstone, 2004) can be well managed. The Web provides the opportunity for reporting research and other academic activities across the globe.

The digital dispensation provides opportunities and a wider scope for research within and across disciplines from emerging disciplines such as social informatics, which draws from information science, sociology, computer science, information technology, information systems, management sciences, social work, anthropology, and communication sciences (Babier et al., 2002). Hedstrom (2002) observes that research in almost every discipline depends on well-managed, reliable, and readily accessible digital resources. The decision

by Google, for instance, to digitize print materials from the collections of five major research libraries of Harvard University, Stanford University, the University of Michigan at Ann Arbor, the University of Oxford, and the New York Public Library, would immensely facilitate access by researchers to the full texts of the scanned books in their millions from the participating libraries.

The digital environment provides universities with opportunities to increase the productivity of faculties by expanding geographical reach. Moreover, within such an environment, information needed for research is not necessarily located on campus and both professors and students can find and use them any time from anywhere with a web connection. From the perspective of libraries, their role to enhance research is further enabled. OPACs are now used as gateways to information within and outside information centres. The catalogue is no longer just an inventory or a finding aid (that it used to be) for what the information centre owns, but is now rather a portal to everything that the information centre can access (Stueart, 2006) within and outside the organization. Publishers have also transformed, becoming not only suppliers, but also providers of information directly to the users (libraries), thus cutting the costs of intermediaries.

Scientists in sub-Saharan Africa, where there is a dearth of information resources to support research, are increasingly freely accessing hundreds of scientific and professional journals, papers, documents, encyclopedias, reports, presentations and lectures from services such as *African Journals Online* (AJOL). This represents considerable progress in comparison to the situation prevailing only a few years ago. Several bibliographic networks, such as SABINET (Southern Africa) and Ain Shams University Network (ASUNET) in Egypt, have made it possible to have access to resources such as digitized theses and dissertations, e-books, databases, and more. Others include the African digital library, African online digital library, etc.

Kraut et al. (2003) note that the Internet has changed communication and is enabling researchers to observe new or rare phenomena online and to do research more efficiently, enabling them to expand the scale and scope of their research. The Internet has also enabled scientists to collaborate by increasing the ease with which they can work with geographically distant partners or share information (Walsh & Maloney, 2002). Research enabled through the Internet lowers many of the costs associated with collecting data, especially with regard to human behaviour, as ICT can enable the hosting of online experiments and surveys, allow observers to watch online behaviour, and offer the mining of archival data sources. Through online research, data can be collected from thousands of participants with minimal intervention on

the part of experimenters; for instance, Internet chat rooms and bulletin boards provide a rich sample of human behaviour that can be mined for studies of communication (Nosek, Banaji, & Greenwald, 2002).

The Internet also provides an opportunity to publish results quickly, although in some cases, this also results in the risk that research of low quality is published, especially if the research has yet to be published in a peer reviewed journal. The detailed transaction logs that people leave when using the Internet for a wide variety of activities provide a wealth of potential data for study. Online research also allows a degree of automation and experimental control that can be otherwise difficult to achieve without the use of computers. Moreover, a primary advantage of the Internet for research is the low marginal cost of each additional research participant. Unlike traditional laboratory experiments or telephone surveys, where each new participant must be encountered, instructed and supervised by a person, most online experiments and surveys are automated with a low marginal cost (Kraut et al., 2003).

Challenges of Research in the Digital Dispensation

Despite the potential ICT offers in research, there are several challenges facing researchers in the digital environment, especially in parts of the developing world such as Africa. Mutula et al. (2006), in an empirical study of e-learning at the University of Botswana, identified the following problems facing students: shortage of computers; lack of clarity of online content; poor Internet connectivity; the difficulties associated with locating information over the Internet; the inability to cope with the workload (e.g. too many readings); problems with presenting information in particular formats; and lack of appeal of content, among others. On the question of how well materials were presented online, some respondents felt that materials were not well presented. As to whether the online course was designed with their needs in mind, of the 86 respondents who answered this item, 58 (67.4%) said yes, 17 (19.8%) said no, and 11 (12.8%) did not know. Gerhan and Mutula (2005), in a study of bandwidth problems at the University of Botswana, found that a shortage of computers is often cited at the university as one major factor hampering effective e-learning. In addition, students often complain of poor connectivity to the Internet.

In Nigerian Universities, it is reported that some faculties and departments acquire computers before deciding what to do with them. Moreover, ICTs are purchased but never used, and in some cases the Internet has never been utilised by academic staff for a variety of reasons (Idowu et al., 2003), e.g. inadequate training of lecturers in new skills, and/or unwillingness by the lecturers themselves to learn new skills (Holt &

Crocker, 2000). Zayim et al. (2006), in a study of technology use among members of the medical faculty in a Turkish university, found that faculty members whose ranks were lower than professor had higher self-efficacy beliefs and were more likely to be early adopters of technology. By and large, there is short supply of African scholarly publications on the Internet attributed to, among other factors, the digital divide, low level of awareness about the potential of ICT, high cost of Internet access, inadequate training and skills, lack of resources, poor quality of research, etc.

Within most African universities, research work, particularly theses and dissertations, are not placed online, making their identification and use difficult. This also leads to the unnecessary duplication of research work. Additionally, institutions such as libraries and archives, museums, cultural collections, and other community-based access points, have largely not acquired information technologies to make their content widely accessible (World Summit of Information Society, 2003). This problem causes a paucity of research materials and limits further research. Consequently, the research generated is of poor quality. In the digital research environment information, especially on the Internet, is growing at a phenomenal rate without adequate tools for its bibliographic control, searching, filtering and retrieval. The search engines are inadequate tools as they do not review the documents, directories and gateways and only cover limited materials.

The digital dispensation places a heavy demand on library and information professionals. Stueart (2006) notes that information facilitators in the information age are being called upon to help people use resources, enhance outreach services to various users (such as faculty members), and work with users at the desktop to show them how to use databases. The librarian is also being seen as an information consultant involved in behind the scenes activities, for example helping software designers develop systems that fit into users' information seeking behaviour. They are also increasingly getting involved in developing and imparting information literacy. Stueart (2006) points out that the changes that have occurred in the information environment have also made librarians become negotiators who are responsible for identifying needs; facilitators for providing effective search strategies; educators familiar with literature and information in many formats; and information intermediaries responsible for providing current awareness services and liaison between the seeker of the information and the information itself. The librarian is now also perceived as a knowledge manager responsible for supporting the knowledge access process or directing users to other knowledge experts.

Most countries in Africa lack pervasive Internet connectivity, making it difficult to share research findings with other researchers within and

123

across institutions. This is exacerbated by the fact that social and community informatics infrastructures have not pervaded the breadth and depth of African rural settings, although e-government is increasingly being adopted.

Weak community and social informatics infrastructure means that researchers outside their stations have to walk long distances in order to access the Internet, especially if they do not have their own connectivity either at home or at their places of work. Recent work in the area of digital governance in the US revealed how the lack of appropriate access points amongst communities hinders the provision of services by forcing individuals to travel long distances between offices (Bouguettaya et al., 2001).

Research in the digital era is made difficult because there is currently no sampling frame that provides an approximate random sample of Internet users, unlike random digit dialling in the case of telephone numbers, which provides an approximate sample of countries' populations, especially in the developed world. The problem of representativeness is compounded because many online surveys and experiments rely on opportunity samples of volunteers. As a result, it is not exactly clear how to go about the task of appropriate generalization (Kraut et al., 2003). Moreover, Internet –based surveys pose challenges of generalisation as response rates to online surveys are typically lower than comparable mail or telephone surveys, and when given the choice of electronic or paper-based questionnaires, respondents still overwhelmingly choose paper (Couper, 2001). The researcher also does not have control over the environment in which the research is conducted, unlike in most other scientific experimental settings, given that when people are not identified (anonymous), they feel less accountable for their actions (Sproull & Kiesler, 1991).

The basic ethical principles underlying research involving human subjects, namely respect for persons, beneficence and justice, are difficult to uphold in Internet-based research. This is because Internet research involves two potential sources of risk: harm resulting from direct participation in the research (e.g., acute emotional reactions to certain questions or experimental manipulations), and harm resulting from a breach of confidentiality (Kraut et al., 2003). Kraut et al. (2003) point out that doing research online often leads to a lose of control by the researcher over the context in which data is procured when subjects participate in experiments. Moreover, ensuring informed consent, explaining instructions, and conducting effective debriefings, may be more difficult than in the traditional laboratory experiment. Observations in chat rooms and bulletin boards raise difficult questions about the rights of participants, including privacy and lack of informed consent.

Hedstrom (2002) outlines further research challenges in the digital dispensation. In particular, digital collections are vast, heterogeneous, and growing at a rate that outpaces our ability to manage and preserve them. There are no effective and cost-effective methods to preserve dynamic databases, complex websites, analytical tools, or software for the long-term. Digital resources are also impossible to interpret or use without accompanying tools for analysis and presentation. Moreover, current methods rely on significant human intervention for selection, organization, description and access because most tools for information retrieval, such as search engines, have yet to be perfected. The threat of the interrupted management of digital objects becomes critical because such objects cannot withstand some period of neglect without resulting in total loss. There are questions of intellectual property rights, privacy and trust, which must be addressed by researchers. Access to digital content sometimes experiences interoperability problems, especially across widely distributed and heterogeneous digital archives. Moreover, with the transformation of what was largely in the print environment into mega digital collections, other issues arise that must be addressed, including the integrity of the scholarly research process, publications and communications; intellectual property rights, privacy, and security, among others.

Universities in Africa suffer from internal and external digital divides characterised by disparities in access to new computers, specialised software, broadband, quality networks (based on the segment of the network on which one's computer is connected), and much more. The digital divide in African universities is also caused by the low utilization of existing ICT resources. Mutula (2004) observed that libraries in Africa that had implemented ICTs generally experienced under-utilisation of the technologies on account of lack of sound IT exploitation skills as well as restrictions imposed on their use in some universities. Westra (1993) pointed out that Internet access in libraries was restricted because of the high costs of providing equipment and services. For example, in some Kenyan and Zambian university libraries, Internet access was restricted to postgraduate students and staff only. Such under-utilization has been reported at the University of Zambia, University of Nairobi, Copper Belt University in Zambia, and the University of Botswana (Chifwepa 2003; Yeboah 1999; Adeyemi 2002; Subair and Kgankenna 2002).

The International Telecommunications Union (ITU) (2002) states that the "so-called new or the "quality" digital divide is not attributable to the lack of equipment or connections, but … quantity [and] to quality". Warschauer (2002) adds that bridging the digital divide is about much more than providing Internet and computer connections, because access to ICT is embedded in a complex array of factors encompassing physical, digital, human and social relationships. Green (2000) citing data from the *Education*

Week teacher survey, observed that when teachers were asked why they do not use software or the Internet for instruction, they reported the following reasons, which have nothing to do with access: i) There is a lack of time to prepare and preview software or websites; ii) There is a lack of training on software; iii) Too much time is needed to use technology; iv) Technologies are not aligned with the curriculum and assessment; and (v) It is difficult to find software to meet students' needs. Lenhart et al. (2003) note that not all "have nots" necessarily want to be "haves"; nor do they necessarily view their engagement with ICTs as a positive force that would transform the quality of their lives.

Most of the content providers of digital material are in the developed world, and they are increasingly changing from the purchasing model to licensing, which often overrides the conventional exceptions to copyright as contained in national legislations (such as fair use and fair dealing). This makes it difficult for the information provider to freely avail such information for academic use without breaking license agreements, thus further alienating developing countries from mainstream information (Kiggundu, 2007). The high cost of digital information is reflected in the high costs of access to external databases and the procurement of digital information. This makes it increasingly difficult for libraries, especially in Africa, to subscribe to new journals and books and also maintain existing subscriptions. Libraries the world over have well established traditions of archiving hard copies of all the materials that they acquire, be they journals, books, newspapers, pamphlets, etc. But increasingly, it is becoming more and more difficult in the digital era for libraries to continue with this long established practice because content providers are insisting that once subscription ceases, access to entire databases also ceases. Whereas such restrictions are not applicable to print resources, they are being imposed on electronic resources.

Some journal publishers have terminated their print versions and now concentrate solely on web accessible versions. This, coupled with the proliferation of a wide range of content in the form of e-journals, e-books, institutional repositories, databases and digital libraries, is an obstacle to users who must be connected to gain access to such resources. African universities in the developing world generate large amounts of local content in terms of research and publications, but these research outcomes hardly find their way into international information systems. This, in part, can be attributed to the fact that most of the content is offline (Ballantyne, 2002).

Most universities in the African environment suffer serious bandwidth bottlenecks. Gerhan and Mutula (2004), in a study on the use of the Internet at the University of Botswana to determine the length of time required in a queue to gain physical access to a computer, and the length of time required

for a response from those computers when connected to the Internet; found that respondents cited four reasons for their low use, namely; insufficient computers, inadequate training, slow response times, and restrictions in the time allocated to each user. Mwiyeriwa and Ngwira (2003) noted that in university libraries in Malawi, in spite of the wide variety of electronic resources that were freely available through the Program for the Enhancement of Research Information (PERI) and Health Internetwork Access to Research Initiative (HINARI), the quality of the Internet connectivity was often a great hindrance.

National Universities Commission (2006) in Nigeria points out that universities in that country do not have web presence and perform poorly in webometric ranking factors, and this can make them suffer lower esteem in the eyes of stakeholders such as potential students and funding agencies. This may also affect academic exchange with reputable universities from other parts of the world for teaching and research. The National Universities Commission pointed out that Nigerian universities were performing poorly with regard to research in the digital dispensation because of the scant attention paid to presenting research findings in web-searchable forms; low impact local journals without Internet links; non-publication in electronic journals; absence of Nigerian universities on the Internet (website addresses) in a form that can be picked up by the Cybermetric Research Group (2004); and the lack of up-to-date websites.

Clark Kerr, on "*The uses of the university*" as quoted by Rangaswamy (2000) of Pennsylvania State University, observed that "..of the 75 institutions founded before 1520 AD, which are still doing much the same things in much the same places, about 60 are universities". Christensen (1997) noted that educators are resistant to change. Academics with science backgrounds have also been found to be earlier adopters of electronic journals than those in the social sciences and humanities (Tenopir, 2003).

Way Forward and Conclusion

The digital era offers great opportunities as well as challenges for research in university environments, especially in Africa. However, for universities to make optimal benefits using these technologies, a number of interventions are needed. Universities need to develop research strategies that would define and make available the resources needed, determine qualitative measures of research, define how ethical issues can be observed online, define methods of the peer review process, promote collaboration and partnerships with industry and government, promote the commercialisation of research products, provide mentorship, and provide a complaints resolutions mechanism. Sawyer (2004) observes that research capacity

development in most African countries represents an instance of market failure because explicit public policies do not exist to reinforce and ensure that higher education and research receive adequate investment from both private and public sources for infrastructure development, especially of laboratories, equipment, libraries, and systems of information storage, retrieval, and utilization.

Libraries have a critical role to play in digital scholarship. Libraries can develop mechanisms that enhance easy access to e-information and e-content by creating portals, gateways, and hypertext links to resources. Libraries can also transform their print collections into electronic formats through digitization or subscription to e-journals. Libraries need to transform their collection development policies to support digital scholarship because scientific journals that were a few years ago produced largely in print form are now rolled out first as e-versions. Digital scholarship processes are supported by a range of content in the form of e-journals, e-books, institutional repositories, databases and digital libraries. These resources must be availed by libraries if they are to meet their obligations in the digital environment. There is also a need for libraries to put in place relevant infrastructure to support the integration of various media, such as text, graphics, animations, video and audio, in teaching and research processes.

Because of the increased number of ipod users and enhanced digital literacy in society, libraries in partnership with some faculties need to enhance digital literacy competencies among their staff and students. Libraries must also strive to develop resources such as institutional repositories to support digital scholarship. Institutional repositories contribute to the visibility and international standing of universities and research organizations, especially with regard to scholarly communications. Such repositories are also convenient for harnessing local content, which is necessary for building the knowledge society. In order for digital scholarship to thrive and become institutionalized in the universities, especially in Africa, open access principles should be pursued.

The evolving digital environment demands libraries to put in place mechanisms to harness e-information to support digital scholarship. Libraries in universities and other research environments should consult with authors, publishers, and other stakeholders to work together to develop suitable business models for Africa that would address issues of restrictive copyright regimes and how to further enhance access to digital content. Kiggundu (2007) suggests that developing countries should take a firm stand with regard to provisions in the Copyright and Neighbouring Rights Act of 2000 that expressly prohibits the inclusion of restrictive contractual terms in any contract entered into with information providers, and also by advocating

in WIPO and WTO for such restrictive terms to be prohibited worldwide. For libraries in universities to play their rightful role in the new digital dispensation to support research, governments must also play their part by providing adequate infrastructure and enacting enabling policies that promote open Internet access to stem the widening digital divide that hampers the implementation and support of digital scholarship.

Within academic environments around the world, there have been various responses and interventions to changes in the paucity of resources, including the establishment of digital libraries, institutional repositories, open access, federated search engines, e-learning, and more. The Southern African Regional Universities Association (SARUA) Leadership Summit held at the University of Botswana on Open Access from Nov 20th - 21th, 2007, highlighted the importance of raising awareness about institutional repositories in the core business of universities and in support of scholarly communications. The Summit reiterated the strategic importance of institutional repositories as contributors to the visibility and international standing of universities and research organizations in the realm of scholarly communications, and more generally for local content which is necessary for local contributions to the knowledge society. Universities, researchers, and scholars should provide leadership by placing their research output on institutional repositories.

References

Adeya, C.N. (2001). Information and Communication Technologies in Africa: A Review and Selective Annotated Bibliography 1990-2000. Oxford: International Network for the Availability of Scientific Publications (INASP).

Adeyemi, B.M. (2002). Problems and Challenges of Automating Cataloguing Processes at KDL Library, University of Ibadan. *African Journal of Library, Archives and Information Science*, 12(2), 213-222

Association of Research Libraries. (2006). Digital Scholarship. [Online]. Available at: http://www.createchange.org/digitalscholarship.html [Accessed 28 September 2007].

Ballantyne, P. (2002). Collecting and Propagating Local Content Development: Synthesis and Conclusions. [Online]. Available at: http://portal.unesco.org/ci/en/files/5578/10342670280collecting_and_pro

pagating_local_dev_content.pdf/collecting%2Band%2Bpropagating%2B local%2Bdev%2Bcontent.pdf [Accessed 24 September 2007].

Bieber, M., R. Civille, M. Gurstein and N. White. (2002). A White Paper Exploring Research Trends and Issues in the Emerging Field of Community Informatics.http://www.is.njit.edu/vci/vci-white-paper.doc. [Accessed December 24 2004].

Biermann, E and Jordaan, M.C.E. (2007). Developing Applied Research Skills in 4th Year Students Using E-learning: A Case Study. Paper Presented at the WWW Applications Conference Held from 5-7 September 2007 at the University of Johannesburg, South Africa.

Botha, C.T and Simelane, S. (2007). The Influence of E-learning on Students Success Rate in Human Resource Development. Paper Presented at the WWW Applications Conference Held from 5-7 September 2007 at the University of Johannesburg, South Africa.

Bouguettaya, A.; Ouzzani, M; Medjahead, B and Cameron, J. (2001). Helping Citizens of Indiana: Ontological Approach to Managing State and Local Government Databases. IEEE Computer, February.

Chifwepa, V. (2003). The Use of the Intranet and Internet by Teaching Staff of the University of Zambia. *African, Journal of Library, Archives and Information Science*, 13(2), 119-132.

Christensen, R. (1997). Effect of Technology Integration Education on the Attitudes of Teachers and their Students. Doctoral Dissertation, University of North Texas, Denton.

Couper, M. P. (2001). Web Surveys: A Review of Issues and Approaches. *The PublicOpinion Quarterly, 64*(4.), 464-494

Cybermetric Research Group . (2007). Webometric Information. [Online]. Available at:http://www.webometric.info [Accessed 14 July 2008].

Department of Education and Youth Affairs. (2001). Information and Communication Technology for Teaching and Learning. [Online]. Available at: http://www.detya.gov.au/schools/publications/index.htm [Accessed 5 September 2004].

Gerhan, D. and Mutula, S.M. (2005). Bandwidth Bottlenecks at the University of Botswana: Complications for Library, Campus, and National Development. *Library Hi Tech* 23(1), 102-117.

Green, L. C. (2000). Bridging the Digital Divide in Our Schools –Achieving Technology Equity for all Students*,* Education Market Research, N.Y

Hedstrom, M (2002). Research Challenges in Digital Archiving and Long-term Preservation. [Online]. Available at: http://216.239.59.104/search?q=cache:6HH6B3VXHkUJ:www.sis.pitt.e du/~dlwkshop/paper_hedstrom.doc+Challenges+of+doing+research+in +a+digital+environment&hl=en&ct=clnk&cd=4&gl=za&client=firefox-a [Accessed 28 August 2008].

Holt, T.D. & Crocker, M. (2000). Prior Negative Experiences: Their Impact on ComputerTraining Outcomes. *Computers and Education, 35*(4), 295-308

Hopkins, J.D. (1996). Information Technology and the Information Society in Europe: Expectations and Barriers to the Implementation of New Media in the Higher Education and Research Sector. [Online]. Available at: http://www.uta.fi/FAST/JH/iteurope.html [Accessed 4 January 2000].

Idowu, P.A., Adagunodo, E.R. & Popoola, B.I. (2003). Computer literacy Level and Gender Differences Among Nigerian University Staff. *The African   Symposium*, 3(3). [Online]. Available at: http://www2.ncsu.edu/ncsu/aern/comlit.pdf [Accessed 18 August 2008].

International Telecommunication Union. (2002). World Telecommunication Development Report: Reinventing Telecom, 6th.ed. International Telecommunication Union, Geneva.

James Cook University. (2003). What is Research?. [Online]. Available at: [Accessed 26 August 2008].

Kiggundu, J. (2007). University Education and Intellectual Property in the Digital Era: Whither Botswana?' Seminal Paper, University of Botswana April 14 2007, Gaborone.

Kraut, R. Olson, J. Bruckman. A., Chen, J. and Couper, M. (2003). Psychological Research Online: Opportunities and Challenges. Pittsburgh PA. HCI Institute Carnegie Mellon University

Lenhart, A., Horrigan, J., Rainie, L., Allen, K., Boyce, A., Madden, M. and O'Grady, E. (2003). The ever–shifting Internet Population: A New Look at Internet Access and the Digital Divide. [Online]. Available at: http://www.PewInternet.org/ (Accessed 11 May 2003).

Livingston, P. (2004). Laptops Unleashed: A Middle School Experience. *Learning and Leading with Technology*, 31(7), 12-15.

Lor, P. J. (1998). Critical Issues Facing LIS Journals: An Author's Perspective. Amsterdam. 64th IFLA General Conference August 16 - August 21, 1998. [Online]. Available at: http://www.ifla.org/IV/ifla64/014-118e.htm [Accessed 26 September 2007].

Moahi, K. (2007). Library and Information Science Research in Botswana: An Analysis of Trends and Patterns. World Library and Information Congress: 73rd IFLA General Conference and Council, 19-23 August 2007, Durban, South Africa. [Online]. Available at: http://www.ifla.org/iv/ifla73/index.htm[[Accessed 2 October, 2007].

Mutula, S.M. (2004). Review of "IT diffusion in Sub-Saharan Africa: Implications forDeveloping and Managing Digital Libraries". Keynote Address Delivered at the IFLA-Africa Section Workshop on 'Developing and Managing Digital Libraries' Held in Gaborone Botswana from 23-27 February 2004.

Mutula, S.M.; Kalusopa, T; Moahi, K and Wamukoya, J. (2006). Design and implementation of an online information literacy module: Experience of the Department of Library and Information studies, University of Botswana. *Online Information Review* 30 (2), 168-187

Mwiyeriwa, S. S. and Ngwira, M. E. (2003). A Malawi Library Consortium: Learning as We Go. *INASP Newsletter*24, 9. [Online]. Available at: http://www.inasp.onfo/newslet/nov03.html#8 [Accessed 18 June 2004].

Nosek, B. A., Banaji, M., & Greenwald, A. G. (2002). Harvesting Implicit GroupAttitudes and Beliefs from a Demonstration Web Site. *Group Dynamics, 6*(1), 101-115.

National Universities Commission (2006).Getting Better Quality Teacher (in right quantity) for Nigerian University System. *NUC Monday Memo,* February 20.

Rangaswamy, A. (2000). Teaching and Learning in the Digital Environment: Opportunities and Challenges for Universities. Paper presented at Sixth Annual ALN Conference November 5, 2000, Pennsylvania State University

Sawyer, A. (2004). African Universities and the Challenge of Research Capacity Development. *JHEA/RESA* 2(1), 213–242

Subair, S.K and Kgankenna, F. (2002). Information Technology Knowledge and Skills of Agricultural Researchers in Botswana. *African Journal of Library, Archives and Information Science*, 12 (2), 201-212.

Stueart, R. (2006). Digital Libraries: The Future of Scholarly Communication. Paper Presented at The University of Botswana in UB Library Auditorium. From 10-11th August 2006.

Tenopir, C. (2003). Use and Users of Electronic Library Resources: An Overview and Analysis of Recent Research Studies. Washington: Council on Library and Information Resources.

University of Botswana, (2001). University of Botswana eLearning. Gaborone. UBEL

The University of Melbourne, (2008). Definition of Research Excellence: Melbourne Law School. Melbourne: Office for Research, University of Melbourne.

Walsh, J. P., & Maloney, N. G. (2002). Computer Network Use, Collaboration Structures, and Productivity. In S. Kiesler (Ed.), *Distributed Work* (pp. 433-451). Cambridge, MA: MIT Press.

Warschauer. M. (2002). Reconceptualising Digital Divide. [Online]. Available at:http://www.firstmonday.org/issues/issue7_7/warschauer/ (Accessed 1 September 2007).

Westra, P.E. (1993). National Libraries in Southern and Eastern Africa: Current State and Future Prospects. Paper Presented at IFLA General Conference, Barcelona.

World Summit on the Information Society. (2003). Declaration of Principles and Plan of Action. [Online]. Available at: http://www.itu.int/wsis/documents/doc_multi. asp?lang=en&id=1161|1160 [Accessed 26 September 2007

Yeboah, T. (1999). The Management of Information Literacy Skills Program for Science Undergraduates at the University of Botswana. *African Journal of Library, Archives and Information Science*, 9(2), 143-152.

Youngman, F. (2007). Opening Speech at the Digital Scholarship Conference Held at the University of Botswana Library Auditorium, 12-13 December 2007.

Zayim, N., Yildirim, S. & Saka, O. (2006). Technology Adoption of Medical Faculty in Teaching: Differentiating Factors in Adopter Categories. *Educational Technology & Society,* 9(2), 213-222.

135

Information Ethics Education in Library and Information Science Departments/ Schools in South Africa

Sipho Cyril Ndwandwe,[20] Dennis Ocholla[21] and Luyanda Dube [22]
Department of Library and Information Science
University of Zululand
South Africa
Email: sndwan@pan.uzulu.ac.za, docholla@pan.uzulu.ac.za
and ldube@pan.uzulu.ac.za

Abstract

This paper investigates the nature and level of information ethics education in Library and Information Science in South Africa. The study was carried out using both qualitative and quantitative methods through a survey and content analysis. All 11 LIS Departments in South Africa were targeted. Within these departments, the departments' heads, lecturers teaching the module, and the course outlines/study guides of information ethics modules formed the target population. Data was collected via questionnaires that were emailed to the Heads of the various LIS Departments, who were also requested to forward a separate questionnaire to the lecturers teaching an information ethics module. Of the eleven LIS Departments, responses were received from only seven. These were departments from the Universities of Zululand, Pretoria, Cape Town, South Africa, KwaZulu Natal, and the Western Cape; and the Durban University of Technology. The results of the study indicate that in most LIS Departments, information ethics is taught in the content of other modules and not as a stand-alone course. In the LIS Departments that offer a stand-alone information ethics module, the module is only first offered in 2nd year, the rationale being that at this level, students are senior enough to appreciate information ethics. It was also found that the stand-alone information ethics module was only offered by the LIS Departments. Furthermore, only one lecturer from the University of South Africa had a background in both Library and Information Science and Philosophy; the rest of the lecturers in the LIS Departments had backgrounds only in Library and Information Science. Taking into account the ethical dilemmas facing information professionals, the study recommends that information ethics be made a major component of LIS education and training, in which case it would be offered as a full stand-alone module.

Keywords: Information Ethics; LIS Education ; Library and Information Science; LIS Schools, Africa.

Introduction

This paper acknowledges and recognizes the ethical challenges and dilemmas facing information professionals, and thus investigates and

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[20] Sipho Cyril Ndwandwe is a Masters student in the Department of Library and Information Science and Senior Committee Officer, University of Zululand

[21] Dennis Ocholla is a Professor, Head of the Library and Information Science Department, and Vice Dean at the Faculty of Arts , University of Zululand

[22] Luyanda Dube, is an Advisor: Quality Promotion and Assurance, University of Zululand. She was a former Lecturer at the Department of Library and Information Science

compares the teaching and learning of information ethics in Library and Information Science (LIS) Departments in South Africa. In short, the paper aims to establish how LIS Departments in South Africa are preparing students in light of their ethical dilemmas. The major objectives of this paper were to determine the curriculum presence of information ethics modules in LIS Departments, establish who teaches information ethics modules in terms of academic departments and areas of knowledge and expertise, solicit what is taught in information ethics modules in terms of modules' content, determine the academic level at which information ethics modules are taught, and cite the challenges facing information ethics education in LIS Departments in South Africa.

It is without argument that in the course of building the information and knowledge society of the present/future, we have come to deal with a tremendous increase in the quantity and diversity of information. This condition has also arisen from new information technologies that supply new, almost unlimited possibilities in the creation, processing, storage, retrieval and dissemination of information. The flood of information now constitutes a substrate of the information market, wherein information becomes a commodity (Babik, nd: 1). In turn, this situation has become a source of many problems related to the right selection of information, information management and ethical responsibility on the part of information-process participants.

According to Stahl (2008:1), if we are truly living in the early stages of what has been termed the information society, then clearly ethical concerns with regard to information are of central importance. Consequently, there has been growing interest in issues that deal with information ethics. The term 'information ethics', according to Kadu (2007:2), Babik (nd:3) and Froehlich (2004), was first coined by Robert Hauptman, the founder of the *Journal of Information Ethics*, and Rafael Capurro in his 1988 article on "Informationethos und Informationethik". Since then, the field has evolved as a discipline in Library and Information Science. However it has, over the years, been embraced by many other disciplines (Froehlich 2004:1). Froehlich observes that information ethics can now be seen as a confluence of the ethical concerns of media, journalism, LIS, computer ethics, management information systems, business, and the Internet.

According to Adam (2005), information ethics is the field that investigates the ethical issues arising from the development and application of information technologies. It provides a critical framework for considering moral issues concerning information privacy, moral agency (e.g. whether artificial agents are moral), new environmental issues (especially how agents should behave in the infosphere), and problems arising from the life-cycle

(creation, collection, recording, distribution, processing, etc) of information, especially ownership and copyright in view of the digital divide. For Babik (nd:4), information ethics concerns all human activity related to information, i.e. our relationship with information, what we do with information, or how we generate, process, and distribute it in the form of new technologies and innovations, which contain a lot of processed information. Babik further posits that information ethics is a comprehensive discipline that connects descriptive ethics with normative and applied ethics. As a descriptive theory, it focuses on the influence of power structures on the information attitudes and traditions of various cultures in various times, e.g. on the development of ethical values related to information transfer and processing in the global information society, and ethical conflicts related to the use of new information technologies and making information available. As a normative theory, ethics determines the standards of professional conduct and behavior in today's global information dispensation.

Information professionals play an extremely vital role as participants in the information society, given that their mission includes gathering, processing, distributing and using information (Fallis 2007). Like lawyers, doctors, and other professionals, they need to carry out their duties in an ethical manner, and like these professionals, they regularly face ethical dilemmas pertaining to information access, privacy, accuracy and intellectual property.

Ethical Dilemmas Facing Information Professionals
Some of the ethical problems faced by information professionals in a library environment, as observed by Fallis (2007:14), include the following:
1. Should they put Internet filters on all the computers in the library?
2. Should they tell law enforcement officers investigating potential terrorists what a particular person has checked out?
3. Should they add books donated by a racist organization to the library collection?
4. Should they allow a homeless person, who happens to smell very bad, to use the library?
5. Should they include Holocaust denial literature in the library collection?
6. Should they charge for specialized information services in a public library?
7. Should they put a warning label on an encyclopedia that contains clearly inaccurate information?

What can be ascertained from these dilemmas is that they are all elements of the issues of information ethics already mentioned, i.e. issues of privacy, accuracy, intellectual property and access. According to Hannabus (1996:3), despite the ethical dilemmas facing information professionals, they are still obliged by society to provide accurate and reliable information;

maintain a confidential relationship with their clients; observe and encourage respect for the intellectual property rights of information products; and ensure equitable access to information. Fallis (2007:12) proposes that some of the ethical dilemmas faced by information professionals have come about because of advances in information technology. However, he warns that information ethics is not solely about the problems associated with information technology, rather information technology only forms a small part of information ethics. According to the author, all the problems facing information professionals fall within the scope of information ethics.

Fallis (2007) proposes that in order to deal effectively with their ethical dilemmas, information professionals should have a good working knowledge of information ethics. He believes that information ethics should be part of LIS education and training, as this would enable information professionals to safely and ethically take part in the processing of information. Despite the importance of the subject in LIS, both Fallis (2007:5) and Smith (2002:1) have observed that there are still relatively few courses or continuous education programmes that focus on ethical issues in Library and Information Science.

In South Africa, the LIS curriculum is an area that has been subject to a lot of research over the years. However, most research on the curriculum has focused on the employability of LIS graduates, and not really on what should make up LIS education and training in the country. This is illustrated in a study by Ocholla (2005) on the job market of LIS graduates in South Africa. Results of such studies indicate what skills and knowledge are required in the job market and how the curriculum needs to be shaped to meet industry needs. Another study by Ocholla (2000) showcases this, where views were obtained through a survey method from employers to review and possibly revise the curriculum of the LIS Department. In keeping in line with industry requirements, there is, however, a tendency to overlook core modules of LIS. Modules such as information ethics, which are fundamental in LIS education, are often ignored. This study therefore also investigates whether LIS departments in South Africa have succumbed to industry pressure and overlooked the fundamental basics of LIS education and training.

Methodology
The study employed a combination of both qualitative and quantitative methods based on the premise that when both paradigms are used, a deeper understanding and insight into the research problem can be achieved. Therefore, both a survey and content analysis were employed. The survey mainly focused on obtaining views from the respondents on the nature of information ethics education in the Library and Information Science Departments, while content analysis aimed to examine the scope of the

139

content in information ethics modules. Thus content analysis was used in juxtaposition with the survey method in order to determine what was being taught in an information ethics module. All eleven LIS Departments were targeted, within them: the Heads of Departments; lecturers teaching information ethics modules; and information ethics modules' study guides to analyze the content. Data on curriculum issues and design, i.e. what is being taught and when, was sought from the Heads of Departments, while data on the teaching of the subject was sought from the lectures (considered to be at the operational level). Study guides were largely targeted for triangulation purposes. The primary aim of the study was to investigate the nature and level of information ethics education in South Africa, which meant that it was necessary to obtain views from all the LIS Departments/Schools in the country. Since the number of LIS Departments in South Africa is eleven, it was deemed necessary to include all 11 LIS Departments. This meant that no sample was drawn. Data was collected through questionnaires and a content analysis schedule. The use of questionnaires was deemed logical, given the fact that LIS Departments in the country are dispersed. Questionnaires were sent to all eleven Heads of LIS Departments, who were then requested to forward a separate set of questionnaires to the lecturers teaching information ethics modules. Departments were also requested to forward the study guides of the information ethics modules taught in their departments for content analysis.

Discussion of Findings

Background of Library and Information Science Departments

The study initially targeted all eleven Library and Information Science Departments in South Africa. Responses were received from seven of these departments. In cases where responses were not obtained, either the department had no dedicated website, or there was no response to the mailed questionnaires. Responses were received from the LIS Departments at the University of Zululand, University of Pretoria, University of Cape Town, University of KwaZulu Natal, Durban University of Technology and the University of Pretoria.

The trend reported by Ocholla and Bothma (2007) that LIS Departments have, over the years, changed their names and consequently moved to other faculties, was still visible. The authors attributed this to the changes in the information environment which have led LIS Departments to adapt their curricula, their names and their institutional alignments to reflect these changes. For example, the LIS Departments at the University of Pretoria and South Africa have moved to other faculties, and the departments names have been changed to 'Departments of Information

Science'. This trend clearly demonstrates a change of focus that directly affects the curriculum. LIS schools have been observed moving away from traditional library orientation to recent fads such as knowledge management and other emerging courses.

However, irrespective of these name changes and/or migrations, LIS Departments are still training information professionals who have a responsibility to ethically carry out their missions (Hannabus, 1996:3). Changes in focus and moving with the times should not necessarily rule out information ethics education, as ethics threads through all information-related activities.

Necessity of Information Ethics Education in LIS

There was a strong feeling among the respondents (referring to the Heads of Library and Information Science Departments) that information ethics education is necessary in LIS. For example, the University of Zululand respondent believed that information ethics education is necessary as it views students as information users and future information managers and providers who need to be sensitized to respect intellectual property. It is therefore critical for information-related activities to be done ethically. The respondent from the University of Pretoria also strongly expressed that it is of the utmost importance that information specialists know something about the moral and ethical responsibilities they have towards society. A myriad of other reasons were given by the other respondents relating to access to information, privacy, intellectual property, and so on.

The above ideas are in line with observations by authors such as Fallis (2007), Carbo (2005), Smith (2007), Carbo and Almagno (2001), Babik (nd), the Information Ethics Special Interest Group (2007) and Ocholla (2008), who have acknowledged the significance of information ethics education in Library and Information Science. For example, Smith (2007) believes that the mandate for information ethics education in LIS is the urgency of issues in global information justice. For Smith, threats to information access, accuracy and privacy, and matters relating to the digital divide and alternative technologies, demand immediate attention and provide the rationale for teaching information ethics. To advocate information ethics education in LIS, Fallis (2007) first provides a pyramid of ethical dilemmas facing information professionals, citing a number of authors. Given these ethical dilemmas, he believes that information professionals need additional exposure to information ethics. Woodward in Fallis (2007) further argues that in order to deal effectively with these ethical dilemmas, library professionals need to be able to engage in ethical reasoning. In particular, since these ethical

dilemmas fall within the scope of information ethics, library professionals need to have a sound working knowledge of information ethics.

In support of information ethics education in LIS, the Information Ethics Special Interest Group (2007:2) observes that knowledge and an understanding of pluralistic, intercultural, information ethical theories and concepts (including the ethical conflicts and responsibilities facing library and information professionals around the world) are necessary to enable relevant teaching, learning, and reflection in the field of library and information studies and information-related professions. It further states that many of the important areas and issues currently facing library and information professionals can only be understood in light of their ethical contexts. Librarians and other information professionals must learn to understand the responsibilities and real consequences of their actions, and learn to use their power ethically and responsibly. For Carbo and Almagno (2001), individuals seeking to become professional librarians or archivists, or seeking to work in other information-related organizations, must first learn to develop and hone their individual sense of ethics, live an ethical life, and be educated about the ethical issues of information.

The Information Ethics Special Interest Group states that library and information professionals need to be aware of their duties and the responsibilities they have towards societies and carry them out in an ethical manner. Moreover, a study conducted by Chu (2006) on the LIS curricula of the American Library Association accredited LIS Departments, found that information ethics was among the top core and most visible modules. It is therefore quite clear that information ethics is a fundamental and significant aspect of Library and Information Science training and education.

Who should learn information ethics?

There were mixed feelings from the respondents (referring here specifically to the Heads of Library and Information Science Departments) regarding who should learn information ethics. Some believed that information ethics should only be a part of LIS education, while others unanimously agreed that information ethics education should be made available to all participants in the information society. Those who believed that information ethics education should only be limited to LIS students attributed this to the fact that LIS students would be involved in information gathering, processing, transfer and use. However, this argument does not hold when taking into account that all participants in the information society get to be users of information; therefore everyone should be expected to do so ethically. The respondents who felt that information ethics should be availed

142

to everyone felt that the module may be personalized according to the needs of each discipline.

Carbo (2005) believes that information ethics education should be expanded to become a fundamental component of information literacy programs for all students, beginning in elementary education programs for young children, and extending through to undergraduate curricula. Carbo also believes that more extensive continuous education is needed for all practitioners, and not just information professionals. Judging by Carbos' view, it is clear why information ethics education should be part of other professions and not limited to LIS. Although in Carbos' view this can be done by incorporating information ethics into information literacy programs, departments can alternatively customize their information ethics content to meet their needs and offer this to their students. This is essential, given that we are all users of information. And since we all use information, it is imperative that all sectors of the information society understand and appreciate the ethical and legal issues surrounding the use of information. This, in turn, can only be achieved through education.

5.5. Curriculum presence of information ethics in LIS

Given the fact that all the respondents felt that information ethics was necessary in Library and Information Science education, it was considered necessary to investigate the presence of the subject in LIS Departments. Paradoxically, only three LIS Departments offered an information ethics module as a stand-alone course. In other LIS Departments, the content of information ethics is only touched on briefly in other modules.

A lot has been documented about the importance of information ethics education in LIS by some of the authors mentioned in previous sections. For example, Carbo and Almagno (2001) have also argued about the importance of information ethics education by describing the history of one of the earliest information ethics courses at the University of Pittsburg in the USA. According to the two authors, many of the information professionals who had taken such modules reported that they have been extremely beneficial. From these authors, one can ascertain that information ethics is a major component of LIS education and training. Given the importance of the subject, a full module on information ethics would be better than having the content dispersed and covered briefly in other modules.

The results of this study are, in a way, similar to the findings of a study conducted by Buchanan (2004). Buchanan did a survey on the information ethics modules offered by Library and Information Science programs in the United States. The study found that less than half of the

143

American Library Association accredited programs offered such modules, and only a few of these programs required students to take a module on information ethics. According to the report, in most Library and Information Science programs, ethical issues were only covered briefly in the course of other topics, such as collection management, information policy and information literacy. Metaphorically, this raises the question of whether LIS scholars and educators would want their students to drive on the [global information] superhighway without knowing the rules of traffic. When taking into account the current state of affairs with information ethics education in this country, this appears likely. As the results in this study have shown, in some LIS Departments, information ethics is offered as a full module, meaning that all the rules are taught to students; whereas in others, information ethics is covered briefly in other modules, meaning that only the basic components of information ethics are covered.

Departments teaching information ethics

When taking into account the multidisciplinary nature of information ethics, it was considered essential to find out which academic departments were offering the full module. The study found that in all cases, the module was only offered by the LIS Departments. In terms of areas of expertise and knowledge, the only exception was the lecturer from the University of South Africa (who had a background in both Library and Information Science and Philosophy); the rest of the lecturers had backgrounds only in Library and Information Science.

Although Fallis (2007) believes that the module should be taught by Library and Information Science professionals who understand and have encountered the ethical dilemmas facing information professionals, the multidisciplinary nature of the subject cannot be ignored. Fallis does, however, suggest that information ethics modules should provide library professionals with an understanding of ethical theories and how they apply to concrete practical cases. There is therefore a significant contradiction in Fallis' view, in that if information ethics modules are to provide library and information professionals with a clear understanding of ethical theories and how they apply to concrete cases, then this should perhaps be done by the Department of Philosophy. From this, it appears as though a multidisciplinary approach to information ethics prevails. The bottom line is that the information ethics module should be taught by a knowledgeable and experienced person (Carbo 2005:27, Information Ethics Special Interest Group 2007: 3).

Content of information ethics modules

Information ethics is far too complex to define exactly what should go into a module (Carbo, 2005). Carbo believes that some of the areas or questions to be considered in selecting the appropriate content for an information ethics course include the following: How much of the course should be devoted to ethical foundations? How should practical and theoretical knowledge be balanced? What key issues should be discussed? What multicultural content should be included? And how many materials should be included for each course?

The study found that there was considerable diversity in the content of the information ethics modules offered by the three Library and Information Science Departments. However, there were some similarities; for example, the topic of intellectual property was covered across the board. Depending on the duration of teaching in a year in the three institutions, differences in the amount of content covered seemed to prevail. For example, the duration of an information ethics module offered by the University of Zululand's LIS department is a single term. A term is approximately eight to nine weeks, which may not warrant enough time to comprehensively cover all aspects of the module. In some LIS departments, specifically at the University of Pretoria and the University of South Africa, the module is offered over a semester, which is much longer than a term, meaning that more areas are covered.

Despite the time factor, the content of information ethics modules, as stated by the Information Ethics Special Interest Group (2007:5), should enable students to recognize and articulate ethical conflicts in the information field; inculcate a sense of responsibility with regard to the consequences of individual and collective interactions in the information field; provide the foundations for intercultural dialogue through the recognition of different kinds of information cultures and values; provide basic knowledge about ethical theories and concepts and about their relevance to everyday information work; and enable students to reflect ethically and think critically and carry these abilities into their professional life. From the findings, only the LIS Department at the University of South Africa offers a unit of ethical theories in their information ethics module's content.

Although there is no general consensus on what should go into an information ethics module, there have been suggestions on the core areas that should go into the course. For example, The Information Ethics Special Interest Group (2007:5) suggests that the content should encompass areas such as: intellectual freedom; intellectual property; open access; preservation; balance in collections; fair use; surveillance; cultural destruction; censorship; cognitive capitalism; imposed technologies; public access to government

145

information; privatization; information rights; academic freedom; workplace speech; systematic racism; international relations; impermanent access to purchased electronic records; general agreements on trade and services (GATS) and trade related aspects of intellectual property rights (TRIPS); serving the poor, homeless, and people living on fixed incomes; anonymity, privacy, and confidentiality; human security; national security policies; the global tightening of information and border controls; trans-border data flow; and information poverty.

Similarly, Laudon and Laudon, and O'Brien in Lee, Dark and Chen (2005:2) suggest that an information ethics course should cover the following broad areas: relationship between ethics, social, and political issues in information society; moral dimensions of the information age; basic concepts of responsibility, accountability, and liability; professional codes of conduct; ethical guidelines, information rights and privacy; property rights - intellectual property, accountability, liability, and control systems quality; legal issues in ethics; privacy laws; technology ethics; and computer crime.

Although the scope may differ in terms of the duration of the module, it is worth noting that almost all the areas suggested by the literature are covered in the modules of the LIS Departments in South Africa. There was, however, an area that appeared to be abandoned in terms of content - the professional codes of LIS. Arguably, there would be no better module to teach these codes than one focusing on information ethics. There is also a need for African literature in the content that reflects an African perspective on information ethics.

5.9. Academic levels at which information ethics modules are offered

The study found that in all three LIS departments, the information ethics module was offered in the second year of study. However, the LIS department at the University of Zululand does offer an introductory module at first year level called Information Literacy. During second year, a fully fledged course is offered on information ethics on the premise that second year students are more senior in terms of the work that they have covered, and are thus able to fully understand and appreciate information ethics. This sentiment was shared by the other respondents.

Carbo (2005) disagrees, believing that information ethics education should be expanded to all programmes for all students. Advanced education for doctoral students is particularly important, as it would provide them with the opportunity to be involved in the teaching of information ethics. Judging from Carbos' view, it becomes clear why information ethics education should be started early and continued through to more senior levels. Arguably, if

students are perceived to be senior enough at second year level to appreciate and understand information ethics, then they would be even better at higher levels. Information ethics aims to shape the behavior of students so that they may be better users of information, and this should be continued throughout other levels as students' experiences grow.

Methods used to teach information ethics

In the departments that offered an information ethics module, it was discovered that in some (for example the LIS Department at the University of Pretoria), a combination of lectures and group discussions was used to teach an information ethics module. At the University of Zululand, only lectures were used, whereas at the University of South Africa, case studies were also incorporated. Carbo (2005) notes that students come from diverse backgrounds and are raised with different practical and cultural experiences. Students also have differing levels of ability in the languages in which course material is written. Therefore, among the issues in deciding which teaching methods to use are: How can the instructor best meet the needs of the students? What model of ethical reflection should be used? How can students unaccustomed to questioning others and engaging in ethical or civic discourse be taught to do so? What kinds of assignments and evaluation of students should be used? What are the most agile teaching and learning techniques to use in adapting to individual learning styles and the changing needs of students? And how can the class best focus on understanding the complexities of information ethics and avoid the tendency to move to simplistic dichotomies?

Lee, Dark and Chen (2005:4) observe that the purpose of information ethics education is to make students understand the importance of ethics and its consequences, and this generally comprises moral development. They do, however, note that moral development is a complex construct that consists of cognition, affect, and socialization. Therefore, they believe that the teaching methods suitable for facilitating ethical development in students are those methods that attend to the students' cognitive, affective, and social development. Some of the teaching methods that are likely to enable such development include case studies, team education, group discussions, and role modeling (Lee, Dark and Chen, 2005:4 and Fallis, 2007). Lee, Dark and Chen (2005:4) caution that while these teaching methods are better suited to teaching ethics, ultimately the responsibility of how these teaching tools are used depends on the instructor.

It can consequently be drawn from this that information ethics teaching requires a hybrid of teaching methods (Carbo, 2005). The use of lectures, as is the case at the University of Zululand, would be appropriate if used in conjunction with other teaching methods. Different models may be needed to assist with ethical reflection and decision-making and recognizing

the cultural and other biases in these. A model that works well with certain students may not work as well with others. Cultural biases in some models may introduce barriers to some students. Continuing to explore alternatives and evaluating the effectiveness of various models is necessary to encourage student learning and exploration. Incorporating models, diverse readings, active discussion and interaction among students, and perspectives from outside speakers, provides opportunities for effective learning and enhances education. Thus, a combination of teaching methods should be used to teach an information ethics module.

Challenges of teaching information ethics

There were a variety of challenges pertaining to information ethics education in Library and Information Science Departments in South Africa. The challenges did, however, vary across the departments. The duration of teaching the module came across as a major challenge at the University of Zululand. At the time of research, the duration of teaching was a term. A term is approximately eight to nine weeks, and this does not warrant enough time to fully teach the module. There were, of course, other challenges, such as the need for African literature and an African perspective on the subject, and keeping abreast with the latest developments in information legislation. In one LIS Department, the module was still new and no challenges had been encountered. It was found that getting students to participate in group discussions and challenge certain views was a problem, perhaps due to cultural taboos. Carbo and Almagno (2001) reported similar problems while teaching an information ethics course at the University of Pittsburg. As already noted, they reported that students came from diverse backgrounds and had differing levels of ability in the language in which the course material was written; subsequently, some had difficulty in participating in group discussions where they had to challenge certain views and voice their opinions. In light of this, various teaching methods are recommended for an information ethics module.

Conclusion and Recommendations

The results of the study show a lack of uniformity in Library and Information education and training in South Africa. Although Library and Information Science Departments have, over the years, moved to other faculties and subsequently changed their names, their mission still remains the same, i.e. to train information professionals. There is limited research on the core courses of LIS in South Africa. Even though substantive research has been done on LIS curricula, a great deal of that research has been focusing on the curricula in relation to the employability of LIS graduates, with none concentrating on the core modules of Library and Information Science. This has resulted in a vacuum of what should really make up LIS education and training. The results indicate that in some LIS Departments, information ethics is offered as a full stand-alone module, whereas in others,

the content is dispersed across other modules. There therefore appears to be a need for collaboration among LIS Departments in the country for an agreement on core modules of information ethics, and perhaps what should go into these modules in terms of content. Given the ethical dilemmas facing information professionals and the importance of the subject, information ethics modules should be made part of the core modules of Library and Information Science education and training in South Africa, and ideally, they should be offered as full stand-alone modules.

Since information ethics threads through all human activities in which information and knowledge is generated, processed, stored, disseminated and used, all the people working in the information and knowledge industry, including consumers of knowledge products and services, should (either formally or informally) undergo information ethics education. At the very least, those involved should know their rights and responsibilities with regard to information access and protection. There is an urgent need for collaboration among LIS Departments in South Africa through a professional body or other such avenue to ensure uniformity in the modules offered by the departments. Finally, further research is recommended on information ethics education in LIS Departments on the continent to find out where South Africa stands in relation to other LIS Departments in Africa.

References

Adam D. Moore ed (2005). "Information Ethics: Privacy, Property, and Power", University of Washington Press.

Babik, W, (nd), Sustainable Development Of Information Society: Towards an Ethics of Information, Available Online at: http://opi4.opi.org.pl/repository/68321707f864ce805745886f05bf52e8o7 DD6M.pdf, (accessed 27 May 2008)

Buchanan, E. A. (2004), Ethics in Library and Information Science: What are we teaching? *Journal of Information Ethics*, Vol.13, No.1, 51-60

Carbo, T. (2005), "Information ethics education: A brief overview of current issues", *Computer Society of India Communications*, Vol. 28, No. 12, 25-26. Available Online at: www.capurro.de/csi_June2005infoeth.pdf, Accessed 30 March 2008

Carbo, T. and Almago, S. (2001) Information Ethics: The duty, Privilege and Challenges of Educating Information Professionals, *Library Trends*, Vol. 49 No.3, 510-518,

Chu, H. (2006). Curricula of LIS programs in the USA: A content analysis. Khoo, D. Singh & A.S. Chaudhry (Eds.), *Proceedings of the Asia-Pacific Conference on Library & Information Education & Practice 2006 (A-LIEP 2006), Singapore, 3-6 April 2006* (pp. 328-337). Singapore: School of Communication & Information, Nanyang Technological University, available online at http://dlist.sir.arizona.edu/1401/01/48.Heting_Chu_pp328-337_.pdf

Fallis, Don(2007) Information ethics for twenty-first century library professionals. *Library Hi Tech*, Vol.25, N.1, 23-36 [Online]: http://dlist.sir.arizona.edu/1820/01/fallislibraryhitech.pdf, Accessed 15 April 2008

Froehlich, Thomas (2004), A brief history of information ethics. *Computer Society of India* (CSI), 11-13. Available Online at: www.capurro.de/**csi**_June2005infoeth.pdf, Accessed 15 April 2008

Hannabus, Stuart(1996), *Teaching Library and Information Ethics. Library Management*, Vol.17, No.2, 24-35

Lee, H. Dark, M. & Chen, K.L (2005), *Incorporating Ethics into Management Information Systems Curriculum in Business Schools*, Available Online at: http://www.iacis.org/iis/2005_iis/PDFs/Lee_Dark_Chen.pdf, (accessed 24 July 2007)

Kadu Sarah, B, (2007), *Information Ethics: a student's perspective, available* online at http://www.i-r-i-e.net/inhalt/007/35-kaddu.pdf, (accessed 23

Ocholla, Dennis N. (2008), Information Ethics Education in Africa. Where do we stand?. "Thinking Critically: Alternative Perspectives and Methods in Information Studies" Conference, Centre for Information Policy Research, Department of Information Studies, University of Wisconsin, Milwaukee,15th–17th May 2008, USA.[Online] http://www.lis.uzulu.ac.za/publications.html#2008

Ocholla, D.N. (2005), An *Analysis of the Job Market in Library and Information Services in South Africa. Some Thoughts and Empirical Evidence*: A paper presented at the 8th LIASA (RETIG) Annual Conference, 25th-30th September, Nelspruit, Mpumalanga, Available online at: http://www.lis.uzulu.ac.za/2006/ocholla%20LIS%20Jobs%20in%20South%20AfricaNovember200517th.pdf May 2008)

Ocholla, D.N. (2000), Curriculum response to a changing national and international information environment: Theoretical and

methodological paradigms on review and revision, *Education for Information*, Vol. 19 Issue 2, p143, 25p

Ocholla, D.N. & Bothma, T. (2007), Trends, Challenges and Opportunities of LIS Education in Training in Eastern and South Africa, *New Library World*, Vol, 108, No, 1/2, p:55-78

Smith, Martha M.(2002) *Global Information Ethics: a Mandate for Professional Education*. 68th IFLA Council and General Conference, Glasgow.[Online]http://www.ifla.org/IV/ifla68/papers/056-093e.pdf Accessed 11April 2008

Stahl, B.C, (2008), Information Ethics as Ideology, Available Online at: http://www.cse.dmu.ac.uk/~bstahl/publications/2007_info_ethics_as_id eology_IGI.pdf, (Accessed, 20 September 2008)

The Information Ethics Special Interest Group (IE-SIG) (2007) *Position Statement on Information Ethics in LIS Education, [O*nline]: www.rz.uni- karlsruhe.de/~rj03/pdf/ALISE_IE_SIG_STATEMENT.

Analysis of the web information seeking behaviour of students and staff at the University of Zululand

Ntando Nkomo[23] nkomontando@yahoo.co.uk
Department of Library and Information Science
University of Zululand

Keywords:
Web Information Seeking; Information Seeking Behaviour; Information Behaviour of Students; University of Zululand

1. Introduction and Background

Technologies that allow for advanced information and communication capacities, encapsulated in the term information and communication technologies (ICTs), have continued to diffuse the entire realm of human activity over the past few decades (Farivar, 2004: 17, Miller, Michalski and Stevens of the OECD Secretariat, Advisory Unit to the Secretary General, 1998: 2). In the process, they have infiltrated the everyday activities of various communities, including universities. In this new information environment born out of revolutions in ICTs, particularly the convergence of electronics, telecommunications and computers, newer ways of storing, delivering and retrieving information have arisen. One of the most astounding advances in this realm has been the Internet/World Wide Web. Farivar (2004:17) describes the Internet as the latest (and most awesome) form of widespread communication technology. It is used widely in higher education, and is already involved in the reshaping of education, resulting in transformations in learning, research and work. Reid (2007:142) alludes that many believe that network technology has the potential to trigger systematic reforms in education.

The myriad of services offered by new technologies, particularly the enhanced availability of resources via the Internet and World Wide Web, has affected the information seeking behaviour of students and staff in different ways. Patrons in the information seeking age are seeking ready access to resources. Increasingly, they are accustomed to finding information through electronic systems. For instance, as Wilson (2004:77) observes, scholarly information behaviour today is governed, to a significant extent, by the existence of a wide variety of electronic information sources. Furthermore, the use of libraries as places in which to search for information is being replaced, to an increasing degree, by access to information resources from the office desk and from the desk at home. Marcum, as quoted by Smith (2005:14), describes a situation where "...the new generation academic library users prefer the convenience of digital access above reliance on assistance

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[23] Ntando Nkomo is finalising his Masters work in the Department of Library and Information Science, University of Zululand, South Africa.

from librarians. This preference for the Internet poses a serious challenge to the academic library which has to move from a paradigm of the library as a physical entity to a library where the users do not have to come to physically to make use of it's services." Castellis (2007:248) suggests that "the growing interest … for Internet-based forms of communication is in fact the reflection of the rise of a new form of socialized communication".

2. Aims/ Purpose and Rationale of the Study

The fundamental research problem of this investigation is to examine information seeking on the World Wide Web, and how information services delivered via the web influence student and staff's information seeking behaviour. It is alleged that information seeking on the World Wide Web today provides, for this group of people, a means of accessing diverse sources of information. For this reason, searching the web is now one of the most active information access tasks in higher education. Of concern is how students and staff adapt to the new web information seeking environment. It is also very important to understand what their information needs are, and why and how they seek information online. It is necessary to consider this issue to understand the nature of their information seeking goals, the ways in which they attempt to reach them, as well as their influence on the design of services. In analyzing web-based information seeking, the researcher attempts to obtain a true portrayal of how students and staff seek and use web-based information in their work and/or study settings. In other words, as more users in the academic sector (students and staff) continue to rely on 'hot-of-the-press' information from sources more conveniently embedded in their daily networked life, it is imperative to understand what impact this has on their seeking behaviour. This is because networked technologies are bringing along opportunities and challenges that higher education must comprehend for any effective use of web information services. The importance of such a study is expressed by Urquhart et al (2003: 1), who posit that there is a substantial gap in the evidence surrounding user behaviour concerning electronic information services. The situation has been observed to be dire in the developing world, particularly in Africa.

The general purpose of this study is to examine web information seeking behaviour among students and staff in academic institutions in South Africa. Investigated, for the purposes of this paper, is the status of adoption and use of the web by students and staff at the University of Zululand. To help achieve these aims, the study posited the following research questions:
1 What are the web information needs of students and staff in institutions of higher learning?
2 What is the nature of information sought and why is it needed?
3 How, when and where is web information sought?

4   What are the channels used when searching for information on the web?

5   What are the challenges faced by students and staff when seeking information on the web?

6   How and to what extent has the web affected information seeking behaviour/ habits of students and staff in institutions of higher learning?

3. Methodology

The study employed qualitative and quantitative research methodologies in a survey research design. Data gathering instruments were questionnaires, supported by limited interviews and observation. Kelle (2001: 2) says that qualitative and quantitative methods have often been used together in the same research project, and in many cases, such integration has resulted in illuminating insights about the investigated social phenomena. It is also very common for researchers who are investigating information seeking to employ combined techniques from both research frameworks in a single study. Combining the approaches was a way of rendering research results more reliable and valid by allowing the two approaches to richly compliment each other. Since the study sought to examine web information behaviour, a social phenomenon that is unquantifiable, this was taken into consideration when designing the questionnaire, with much emphasis on open ended questions to facilitate the qualitative collection of data. Interviews were also employed, the aim being to follow up on interesting revelations gathered from the questionnaire and also to support the questionnaire, since it is generally regarded as a quantitative instrument unsuitable for collecting data about behaviour.

The survey population was categorized by faculties using quota sampling. Quota sampling was used because it ensures that some differences within the population are in the sample, e.g. age, sex or background (Neuman, 2006:221). Questionnaires were then distributed to students and staff in accordance with the predetermined quota per faculty. Members of staff were chosen based on availability.

The student sample of 103 respondents was calculated at 1.2 % out of a total population of 8613. The academic staff sample of 11 respondents was calculated at 4% from a total staff population of 281 members. A limited number of interviews consisting of 10 students and 5 members of staff were conducted. A total of 93 (82%) questionnaires were returned (84 [82%] from students and 9 [82%] from members of staff).

4. Findings and Discussions

154

The results obtained from the data collected from students and staff at the University of Zululand is presented below. The results are presented under the following broad subheadings: personal information; general connectivity and access; medium of information; web information needs; web channels of information; web user skills; how users search the web and the steps they take; relevance of the web to studies, research and work; and the web and other information sources.

4.1. Personal Information

A total of 84 respondents were obtained from the questionnaires distributed, 47 (56%) of whom were female and 37 (44%) male. The demographic representation confirms the high number of female enrolment in this institution. All four faculties were included in the survey, and the responses obtained were as follows: the highest number of responses was recorded in the Faculty of Arts (27; 33%), followed by the Faculty of Science and Agriculture (22; 27%), the Faculty of Commerce, Administration and Law (20; 24%), and lastly the Faculty of Education (14; 16%). Responses were obtained from 28 departments, which constitute about half of the 60 or more disciplines currently offered by the institution. Students from all levels of study - undergraduates through to doctorates - were included in the survey, and all academic ranks were targeted. Because responses were obtained largely from a few ranks (lecturer and senior lecturer), it could not be determined if behaviour differs in accordance to rank. Obtaining a clear user profile among academics could have been achieved if the sample response was fairly equal (representative) at all levels. The largest number of responses (4; 51%) was obtained from lecturers, followed by senior lecturers (2; 25%).

4.2. Medium of Information - Preferred medium of Information

Having to choose from three options, i.e. print, electronic, and both print and electronic; the results indicate that although the web (the web here refers to electronic media) as a medium of information is ranked highly, many prefer using it in conjunction with print based resources (both print and electronic).

Table 1 Preferred medium of information (N=82)

Medium of information	Frequency
Electronic	19 (23%)
Print	10 (12%)
Both print and electronic	53 (65%)

Reasons for choosing an information source

155

Although the target number of responses to this question was 81, there were multiple responses provided by respondents, which explains why the total number of responses does not tally with the total number of respondents. Respondents were required to indicate their reasons for choosing an information source. The results are presented in Table 2 below.

Table 2 Reasons for choosing an information source

Reasons for choosing an information source	Frequency/ number of responses	Percent
Accuracy	30	19
Reliability	19	12
Relevance	26	16
Convenience/Proximity	14	9
Accessibility	19	12
Understandability	27	18
Speed/ Timeliness	17	11
Authority	6	4
Total	158	100

A wide range of reasons were cited as important considerations when choosing an information source. Accuracy (19%), understandability (18%) and relevance (16%) were cited as particularly important. Reliability (12%), accessibility (12%) and speed/ timeliness (11%) were also considered of moderate importance when choosing a source, while convenience (9%), proximity and authority (45) were less so. The difference between the highest ranked and lowest ranked reasons for choosing a source was not much of an indication that a combination of issues influences the choice of a particular source. On the whole, it appears no reason seems to distinctly stand out as a major consideration when choosing an information source. Instead, a number of reasons seem to influence that decision.

4.3. General Connectivity and Access
Access to the Internet
With regard to general connectivity and access to the Internet, it was revealed that all (both students and staff) have physical access to the Internet. This revelation is in line with the current status of computer availability in South African institutions of higher education, which is remarkably high. Farrell and Shafika (2007:1) report that a country like South Africa, with its extant infrastructure and more mature economy, is clearly an outlier in terms of being able to implement ICT in its education agenda. 81 (98%) of the 83 respondents indicated having access to the Internet. Upon closer inspection, it was revealed that the 2 respondents who claimed that they do not have access to the Internet could not access

156

university facilities because they were part-time students who lived far from college.

Ways of gaining access to the Internet

Respondents were asked to indicate how they gained access to the Internet and the results are presented in the table below.

Table 3 Ways of gaining access to the Internet (N=75)

How do you gain access to the Internet	Frequency	Percent
Wired office terminal	10	13
Wired computer laboratory	46	61
Wired home PC	2	3
Wired by both home PC & office PC	2	3
Wireless computer laboratory/ library or information centre	1	1
Wired office terminal, wired computer laboratory	6	8
Wired computer laboratory, cell phone	1	1
Wired office, wired home, wired both home & office, wireless laptop	1	1
Wired office, wired computer laboratory, wired home PC, wired dormitory, wired both home & office	1	1
Wired computer laboratory, wired home	3	4
Wired office, wired computer laboratory, wireless computer laboratory	1	1
Wired office, wired both home & office, wireless both home & office	1	1
Wired computer laboratory , wireless home	1	1

The indication is that access to the Internet is still dominated by "traditional" wired connections. There seems to be little exploration of new, more creative means of Internet connection, particularly wireless access. A substantial number of respondents gain access via wired computer laboratories (41; 61%). Only 10 (13%) respondents indicated access via a wired office terminal, and at home. Few reported connection by means of wireless access, be it at home, in the office or in their hostels (3; 4%). This is despite reports in literature (for example Carton, 2004:1) that wireless and other forms of connection, such as broadband access through cellphones and other such gadgets, are reported to be on the rise in other sectors of information seeking. Carton (2004:1) reports that wireless messaging and Internet services are growing dramatically worldwide.

Internet connection types and satisfaction with connection type

A large proportion (44; 62%) of the respondents were not aware (or simply did not know) by what type of connection they gain access to the Internet. This posed a problem when evaluating their level of satisfaction with their Internet connection. There was, in general, a high level of dissatisfaction with connectivity; albeit many were not privy to the details as to what type of connection they had to the Internet. Indications were that 32 (56%) of those gaining access via wired computer laboratories were not satisfied with their mode of connection. On the other hand, there was satisfaction with home access (6; 86%) office access (12; 60%), and both office and home access (3; 75%). There seems to be greater satisfaction from members of staff who constituted the bulk of individuals with home access than with students who gain access mainly by means of computer laboratories.

Although the results indicate that time and access are provided to the extent that just above half (52; 71%) of the interviewed student respondents consider adequate, there was an outcry that a lot of constraints were still hindering effective access for both students and staff. Some of the constraints highlighted were overcrowding in laboratories, the slow speed of the Internet, and restrictions caused by the computer laboratories' opening hours.

*4.4.*Purposes of seeking information from the web

Multiple responses to this question meant that the number of responses would not tally with the number of respondents. Respondents were requested to indicate why they sought information from the web, and the results are presented in Table 4 below.

Table 4 Purposes of seeking information from the web

Purposes of seeking information from the web	Frequency	Percent
Assignments	39	25
Research	29	19
Study	14	9
Communication	26	17
Entertainment	17	11
Teaching	8	6
General awareness	16	10
Presentation	3	2
News	2	1
Total	154	100

Although the information needs of students and staff are numerous and wide-ranging, it surfaced that they can be grouped under the following

core university needs: assignments (25%), research (19%), studies (9%), and work or teaching (6%). One can subsequently add to this communication (17%), entertainment (11%) and the desire to be informed or general awareness (10%). Most people use the Internet as a means of entertainment, communication with friends, and for personal gain (employment seeking). An interesting revelation was that the use of the web at work and at home is reportedly different. Many state they use the web for more ephemeral needs at home, while at work the core needs identified above dominate.

4.5. Web Information Channels

One of the major advantages of the World Wide Web has been its ability to present a wide range and diversity of information. As Fourie (2003116) alleges, it can accommodate traditional information spaces such as in-house web-enabled databases, databases through commercial and aggregator services, library catalogues and CD-ROM databases available through an intranet (set apart from search engines), and document delivery services. Koneru (nd:1) states that the proliferation of information in varying formats and amounts have made the contemporary era 'information intensive' with manifold choices to information access and retrieval. This era is founded on the Internet and the World Wide Web. This study investigated the role that various web channels play in the information seeking process of students and staff. Respondents were required to indicate how often they relied on web information seeking channels. The intention was to use the frequency of use as a measure of the value students and staff attached to the channel. The web channels were online public access catalogues, online databases, search engines, subject portals, websites, e-mail, and electronic document delivery services. The findings are shown in the table below.

Table 5 Frequency of user reliance on web information channels

How often users rely on web information channels	Never		Less than once a month		Weekly		Daily	
	Freq	Percent	Freq	Percent	Freq	Percent	Freq	Percent
Online public access catalogues	20	28	28	38	18	24	9	12
Online databases	39	56	16	23	13	19	2	3
Search engines	1	1	6	8	29	39	38	51
Subject portals	32	46	21	30	11	16	5	7
Discussion lists and newsgroups	31	52	14	23	14	23	1	2

Websites	3	4	12	18	23	34	30	44
E-mail	2	7	18	25	19	27	29	41
Electronic document delivery services	30	50	14	23	14	23	4	3

On average, most respondents showed a high level of familiarity with various web channels, a likely indication that they view the various channels as valuable sources of information, although they do not use them very often (except for e-mail and search engines). On a four point scale of daily, weekly, once a month and never, the responses were as follows: 51% used search engines daily, 44% used websites daily, and 41% used e-mail on a daily basis. Other web channels of information are unpopular and are visited on an irregular basis. The results show mounting evidence of the dramatic change in the intensity of use of the Internet and various web information channels in education. This is in support of literature that states that the adoption of the web is increasing. For example, Spink and Jansen (2004: 21) report that the earliest studies of web searching behaviour were conducted during the mid-1990s when web search engine and web browser use was growing, particularly in academic environments.

The results also indicate that frequently, use is concentrated on a few channels, such as e-mail, websites and search engines. This again is congruent with findings from other studies on web information seeking behaviour that have argued that many users equate the web to a search engine.

4.6. Web User Skills

The emergence of information in electronic format has brought along a number of challenges in the gathering and use of information. As more and more information seeking is done independently, there are a number of challenges that web information seekers face. Among these challenges, one of the most critical is that of skills. The new information environment, which has brought along new forms of information, new information carriers and new routes to information sources together, challenges the literacy skills of information users. An attempt was made to identify the skill-related challenges that students and staff face when seeking information. Results obtained indicate that more than half (52; 67%) of the interviewees profess they possess the necessary skills to be effective web information seekers. This is an impressive figure, although a deeper enquiry revealed the opposite to be true. Skills, on the part of students, are not transferred to meaningful results in class, with lecturers raising concerns that students are not very competent

users of the web. Perhaps this contradiction stems from the over emphasis on button pressing skills - too much attention is paid to the button pressing aspects of ICTs and insufficient attention to usage skills (Millard, 2000: 220). In other words, too many people are taught how the technology works rather than how to use the technology to achieve results. Alternatively, the high levels of skills reported could be a result of a significantly large proportion (47; 59%) having received training on the use of web information. Of this group, an overwhelming majority (32; 71%) is convinced that the training they received was useful, which appears to be a plus for the training programs offered. Those who never underwent any training also believe that training would have been useful (19; 59%). A significantly large number never received training (9; 11% indicated No and 17; 22% indicated More or Less). This group may, with a little assistance, be able to cope. However, they may struggle with higher level tasks, given the fact that most search independently. There are important concerns raised about the nature of information obtained by students and their ability and desire to evaluate online information effectively. Many academics voice their skepticism of the students' ability to effectively evaluate web-based information. To surmise, the results pose a lot of questions about the search capabilities of the respondents, given the fact that most search independently.

4.7. How Users Search the Web and the Steps They Take

People search for content on the web in a number of ways that portray considerable differences in their ability to find various types of content on the web.

Table 6 : Statements defining how users seek information on the web (N= 79)

Statement defining users' seeking behaviour on the web	Frequency	Percentage
I usually seek information with the assistance of a librarian	4	6
I usually get assistance from a friend or colleague	9	11
I usually do the searching myself	63	80
I usually do not seek information from the web	2	3
Total	79	100

As was expected, there was an indication that most respondents search for information independently (80%). This corroborates the claims in literature of a paradigm shift in information seeking from one that is largely intermediary reliant, to one of self service or user-end based seeking (Mutula 2007: n.p, Rudestine in O'Reilly and Associates 1997:3). Assistance from colleagues (9; 11%) was the second most frequently cited means of searching the web.

161

How often users perform information seeking steps

Search strategies have a profound influence on the success of finding information. Respondents were asked to indicate the frequency with which they did certain leading information seeking steps. These were modeled on Kuhlthau's information seeking steps. The relevance of this query was that it would indicate how users formulate the strategy to search for information on the web. The conceptual formulation of a search query is said to be at the heart of searching (Soergel in Davis, 2005: 49). This question targeted only those who claimed they usually did the searching independently on the web. The study sought to determine how they actually went about seeking information on the web in order to determine the steps they took to achieve their tasks. The responses are summarised in Table 7 below.

Table 7 How often users perform information seeking steps

Information seeking step	Very often		Often		Seldom		Never	
	Freq	Percent	Freq	Percent	Freq	Percent	Freq	Percent
Identify a need	29	48	25	41	5	8	2	3
Choose a channel	25	41	24	39	8	13	4	7
Define search query	22	37	13	21	16	27	9	15
Combine terms and use natural language	14	23	23	39	8	13	14	23
Combine terms using controlled vocabulary	17	30	14	24	13	22	14	24
Evaluate results	21	34	19	31	12	20	9	15
Synthesise and use information	21	36	21	36	7	12	9	16
Redo the steps again	16	28	16	28	13	23	12	21

The results show inconsistencies, and therefore no clear trend could be established. The general impression gathered is that respondents' online behavior is neither targeted nor direct. Steps that one would ideally go

162

through in searching for information appear to be followed on an irregular basis. In actual fact, the respondents meander from one step to the next. Perhaps what this serves to confirm is that there are multiple and diverse ways to reach meaningful results.

4.8. Relevance of the World Wide Web to Study and Research

The extent to which many people from various walks of life have come to rely on the web is an indication that they think the Internet is an information conduit relevant to their information needs. The study sought to establish how relevant the web is to students and staff's work, studies and research. Also, the intention was to determine if users successfully get what they set out to find from the web. The study revealed that students and staff are heavy users of the web. Undergraduate students use the web for assignments, graduates for research, and faculty members for research and work (preparing for teaching). A large majority of the respondents (65; 83%) are represented in the group who consider it relevant (32; 41%) and very relevant (33; 42%) to their needs. In spite of claims that the web is relevant, the success rate when searching for information is very low. A mere 22 (28%) indicated that they often find enough of what they need, and 10 (13%) more than enough. On the contrary, 46 (58%) stated that they do not often find as much as they need, and 1 (1%) never found anything they need. On the whole, the results show that the web is considered to be of much relevance to the needs of students and staff. This is in support of general literature on web search studies and is exemplified by the following quote by McCready (2002:1), succinctly explaining how the Internet and the Web is viewed today: "More and more, the public are directed to the Internet and e-mail to transact business, to find information and to communicate with businesses".

Table 8 Time spent on the web in information gathering activities (N=79)

Amount of time spent on the web in information gathering activities	Frequency	Percent
Less than 15 minutes	3	4
15 minutes- One hour	14	18
One hour - two hours	27	34
Two – four hours	23	29
More than four hours	12	15
Total	79	100

The amount of time respondents spend when gathering information from the web also corroborates with the view that the web is considered to be of huge value for studies, research and work. The results show that on any given day, respondents reported that they worked on some of their tasks over a period of several hours, while others spent minutes or occasionally a few hours on an information seeking task. Viewed individually, the results may

indicate less time spent on the web. However, it is worth noting that when combined (27; 34% - one to two hours, 23; 39% - two to four hours, and 12; 15% - more than four hours), the resulting time spent represents a rise or upward trend from earlier related studies on information seeking, albeit those identified did not solely investigate web information seeking behaviour (e.g. Internet use - Mugwisi and Ocholla, 2002; and electronic journal use - Mgobozi and Ocholla, 2002). 78% use the web for more than an hour on a daily basis. This is considerably high, given the many challenges respondents claim to face that hinder access. What is significant, is that they are beginning to think of the Internet as an information conduit worth spending much of their time on.

That there was no one time that seemed to dominate, could be a result of the fact that the respondents are a mixed bag of people, i.e. undergraduates, postgraduates and staff. The sample composition may have influenced the results either way, i.e. increased or decreased the time. For one, undergraduates, who constituted the majority of the respondents, may spend time on non information-gathering activities, like games; or because of the nature of their studies, they would instead rely on recommended texts available in the library in book format.

4.9. The Web and Other Information Sources

The transition from a print-based environment to one that also offers electronic access has affected information seeking behavior. Individuals now have the option of checking an electronic resource in addition to traditional information resources. There is no doubt, therefore, that the web has engineered a shift in the way people visit and use other information sources. For example, the networked environment has changed the way libraries and librarians serve readers. This study sought to determine the potential impact of the web on the use of and visits to other information resources, such as libraries, and to establish whether electronic sources make it easier or more difficult to gather and use information. Responses revealed that although significantly high uses of the web were recorded, respondents believe this has had no significant impact on their use of or visits to traditional information providers. Hybrid use seems to be the order of the day, with both traditional print-based environments and the new e-environments given almost equal attention. Some of the earlier ICT authors mooted that one of the implications of users' experiences and sentiments with the web would be that it would make them decide on whether to continue using other information sources or not. It is this thinking that saw people predicting the demise of the paper, and terms such as the paperless office were coined. There is consensus that the web has made gathering information much easier (52; 72%). An insignificant number indicated that not much has changed (7; 10%), while 9 (12%) believe that it has become more difficult, and 5 (7%) say it has become

much more difficult. Because of the electronic environment's sheer size and breadth, it is encouraging that such a large number of respondents said it has made the gathering of information much easier. It is perhaps an indication that their information retrieval skills are good. It is likely that respondents search and retrieve information from the web even when maximum retrieval effectiveness may not always be achieved.

5. Conclusion

This study revealed illuminating insights about the information seeking behaviour of students and staff at the University of Zululand. There are indications that the World Wide Web (WWW) has already made serious inroads into mainstream education. The WWW represents a fundamental paradigm shift in information seeking. It is a low-cost technology that allows multiple channels of information to be exchanged in a manner beneficial to higher education's user needs. This study revealed that despite requiring a lot of improvement, the university's students and staff are fairly literate in using the Internet and the World Wide Web. The overall picture is that the impact of the Internet and WWW on higher education and its services is very vast. This is confirmed by the relatively high level of awareness and use of the various web technologies, suggesting they fulfill a need and are perceived as providing genuine benefits. The responses also revealed that the University of Zululand continues to increase its use of available ICTs, although there is limited exploitation of new and more innovative access types such as wireless access and mobile technology. The trend towards mobility seems to be negotiated with caution.

References

Carton, S. (2004). Mobile Lifestyle: Changing the Nature of Information. Available at: http://www.clickz.com/showPage.html?page=3297421

Castells, M. (2007) Communication, Power and Counter-power in the Network Society. *International Journal of Communication 1* 238-266.Available at: http://ijoc.org/ojs/index.php/ijoc/article/viewFile/46/35

Farivar, C. J. (2004) "The Powerful Force": An Examination of the Internet in Senegal. Available at: **http://www.osiris.sn/IMG/pdf/These_Farivar.pdf**

Farrell, G and Shafika I. (2007). Survey of ICT and Education in Africa: A Summary Report, Based on 53 Country Surveys. Washington, DC: infoDev / World Bank. Available at http://www.col.org/colweb/webdav/site/myjahiasite/shared/docs/infodev_survey_of_ict_and_education_in_africa.pdf

Fourie, I. (2003) Suggestions for a research framework for South Africa: how can we learn from web information seeking/searching studies? *South African Journal of Library and Information Science,* 69(2). pp 115-125

Kelle, U. (2001). Sociological Explanations between Micro and Macro and the Integration of Qualitative and Quantitative Methods: A Subjective View of Objectivity. Forum Qualitative Sozialforschung / Forum: Qualitative Social Research [On-line Journal], 2 (1). Available at: **http://www.qualitative**-research.net/fqs-texte/1-01/1-01kelle-e.pdf

Kim, K (2001) Information seeking on the Web: Effects of user and task variable. *Library & Information Science Research* 23.pp 233–255. Available at: http://www.sciencedirect.com/science?

McCready, P. (2002) Inquiry into the Role of Libraries in the Online Environment. Availableat:http://www.aph.gov.au/senate/committee/ecita_ctte/completed_inquiries/2002-04/online_libraries/submissions/sub131.doc

Millard, J. (ed) (2000) Messages from Telework '99 main sponsors Available at: **http://www.eto.org.uk/twork/aarhus99/aarhusmain.pdf**

Mgobozi, M & Ocholla, D.N (2002).The use of electronic journals for the dissemination of scholarly information by the University of Natal and the University of Zululand. In: Bothma, T.J.D and Kaniki, A. (eds.) Proceeding of the 2nd biennial ProLISSA Conference, (pp 29- 4*8)*. Pretoria: Infuse.

Mugwisi, T & Ocholla, D.N (2002) Internet use, trends and attitudes among academic librarians: a comparative study between the University of Zimbabwe and the University of Zululand. In: Bothma, T.J.D and Kaniki, A. (eds.) Proceeding of the 2nd biennial ProLISSA Conference, (pp. 143 – 166). Pretoria: Infuse.

Mutula, S. (2007) Paradigms shifts in information environment: prospects and   challenges African libraries. Available at: www.emeraldinsight.com/0737- 8831.htm

Neuman, L. W. (2006). Social Research Methods: Qualitative and Quantitative   Approaches 6th ed. Boston, Pearson

Reid, S (2007) Communication Channels and the Adoption of Web-based Courses by University Professors. *Journal of Interactive Online Learning 6(3)*   Available at: http://www.ncolr.org/jiol/issues/PDF/6.3.1.pdf

Smith, M.Q. (2005). The impact of information and communications technology   change on the management and operations of academic libraries Available at:http://etd.uwc.ac.za/usrfiles/modules/etd/docs/etd_init_6930_1173956962.pdf

Urquhart, C. Thomas, R. Lonsdale, R. Spink, S. Yeoman, A. Fenton, R and Armstrong, C. (2003). Uptake and use of electronic information services: trends in UK higher education from the JUSTEIS project. Availableat:http://cadair.aber.ac.uk/dspace/bitstream/2160/191/3/JUSTEIS-   Program-rev14Apr.pdf

Wilson, T.D. (2004) Information-seeking behaviour and the digital information world. *European Science Editing* 30 (3). Available at: http://informationr.net/tdw/publ/papers/2004ISBandDigitalInfo.html

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A Viability Study on the Use of Mobile Phones and Podcasts among Students and Lectures at the University of Zululand

Xolile Sihlongonyane[24]- xolie@webmail.co.za,
Department of Library and Information Science
University of Zululand

Abstract

This paper aimed to establish the viability of using mobile technologies, specifically mobile phones and podcasts, for learning and teaching purposes at the University of Zululand. It was observed that there are many students who are in possession of mobile phones; leading us to believe that they would use the technology for learning purposes. Specifically, the study focused on what mobile phones and podcasts are used for, when they are used, where they are used, how effective they are, and why they are used. Also investigated was whether or not lecturers have knowledge of podcasts. The objectives were met through a literature review focusing on mobile phones and podcasts and a study on fifty (50) students and twenty eight (28) lecturers at the University of Zululand. This paper focuses on the literature review part of the study.

Introduction

This study examined the viability of using mobile technologies, specifically mobile phones and podcasts, for learning purposes and teaching at the University of Zululand. By all appearances, the use of mobile technologies (handheld electronic devices) appears to be increasing in various sectors of society, such as in business, research, and in educational institutions. These technologies offer convenience, ease of use and modern innovative ways of gaining access to the Internet, such as through wireless connections (GPRS, WAP). More and more people now have access to the Web from virtually anyplace imaginable. Often, a large number of these people access the Internet via mobile phones. It was therefore not surprising to observe that most students at the University of Zululand are in possession of mobile phones, including those that offer Internet access.

In the Wikipedia (2008: n.p), mobile phones are known by different names, such as wireless phones, cellular phones, cell phones or hand phones; and are defined as portable electronic devices used for mobile voice or data communication over a network of specialized base stations known as cell sites. Mobile phones are characterized by the type of phone, (e.g. Nokia, Samsung, LG, Ericsson) and size, weight, battery life, performance and features (for example, the Nokia phone has features that include MMS, SMS,

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[24] Xolile Sihlonganyane is an Honours Bachelor of Information Science student at the Department of Library and Information Science, University of Zululand. This paper was presented during the 9ᵗʰ DLIS Annual Conference from the 5-6ᵗʰ September at the University of Zululand

Bluetooth, Internet, WAP, and GPRS, etc). Mobile phones are highly flexible, seeing as they serve as a communication tool also used for sending and receiving messages, watching TV, Internet surfing and banking, taking photos, checking e-mail, listening to music, playing mobile games and much more. Thus mobile phone users are equipped with an efficient way to instantly send data to the home or office, check for important e-mail, use their cell phone as a PDA or calendar, and store photos that can be easily transferred to a PC or laptop computer, among other applications.

According to Campbell (2005) a podcast consists of a series of digital-media files, which are distributed over the Internet using syndication feeds for playback on portable media players and computers. Thus, the term podcast, like broadcast, can refer either to the series of content itself or to the method by which it is syndicated; the latter is also called podcasting. Campbell (2005) also notes that a podcast is distinguished from other digital media formats by its ability to be syndicated, subscribed to, and downloaded automatically when new content is added, using an aggregator or feed reader that is capable of reading feed formats.

Podcasting has become increasingly popular in education, particularly in western countries, and the technology is finally hitting developing countries such as South Africa. Campbell (2005) explains that podcasts enable students and teachers to share information with anyone at any time. For example, an absent student can download a podcast of the recorded lesson. It can also be a tool for teachers or administrators to share the curriculum, assignments and other information with parents and the community. Teachers can record book discussions, vocabulary or foreign language lessons, international pen pal letters, music performances, interviews, and debates. Podcasting can also be used as a publishing tool for student's oral presentations. Video podcasts can be used to further the above mentioned capabilities.

2. Purposes of the use of mobile phones and podcasts for learning

According to Thomas (2005), the main reasons for the use of mobile phones and podcasts in learning are that they provide:

- Core materials such as recordings of an entire series

- Lecture material in different formats; e.g. mobile devices can be used to access reference material copied from lecturers. These formats exist in content in a way that is consistent with its original design, and are accessible on a mobile device such as a mobile phone/podcast

- Supplements to course material, whereby a collection of podcasts provide information on various topics related to the course material.

169

- Recordings of textbook material, journals, authentic speeches, programs, etc

- Pre-class listening material

3. Uses of mobile phones and podcasts for learning

There are various uses of mobile phones and podcasts. According to Yuen & Wang (2004), mobile phones are used by students in the following areas to support teaching/learning:

- Recording interviews with informants.
- Recording their own works, e.g. oral examinations, oral reports, presentations, group discussions, etc. for tutor evaluations, peer evaluations, and self-evaluations.
- Listening to authentic audio material - music, speeches, interviews, vocabulary, audio books, poems, etc.
- Accessing multimedia material, such as movies, paintings, photographs, documentary, visual glossaries, etc.
- Referring to preloaded information during a field trip or field study.
- Producing their multimedia presentations, assignments, and/or projects.
- Chatting with other students in order to assist each other; for example reminding each other about pending assignments.

Yuen and Wang (2004) further state that podcasts can be used in different subjects (especially subjects that require note-taking). They therefore have potential application in the following areas to support teaching/learning:

- Lecturer-generated pre-class listening material, such as news, reviews of journal articles, activities of the week, feedback and comments on assignments and activities, explanation of difficult terms, background information of the subject, questions students need to think about before class, etc.
- Student-generated podcasts based on students own summaries, reflections, comments, thoughts, and conclusions. This is for students to share their own ideas with others via podcasting.

4. Benefits for students in using mobile phones and podcasts for learning purposes

Campbell (2005) lists the benefits as follows:

- Students have the ability to repeat lectures anytime, anywhere.
- Students can record lectures, teachers' notes, meeting and conference notes with teachers/other students, and oral reports, and student project support interviews for different subjects.
- Non-native English speaking students can repeat lectures that they didn't understand.

170

- Students who are severely dyslexic or suffer from visual or hearing impairments can also benefit from the use of podcasts and mobile phones.
- Students can review lectures before exams.
- Students can listen to the lectures they have missed.
- Students can ruminate and listen again to lectures and tutorials as an exercise to encourage critical, analytical approaches.

5. The effectiveness of the use of mobile phones and podcasts for learning

Mobile phones and podcasts are already widely used in western countries, and play a vital role in learning because they are highly effective. *The Communication Africa Journal* (2008) states that the government of South Africa (Department of Education) has launched "M4Girls", an innovative pilot project using Nokia 6300 mobile phones which have been loaded with educational content to help improve the mathematics performance of grade 10 girls. The project demonstrates the potential of mobile phones to enable social development and improve education, especially in under privileged areas.

The *Communication Africa Journal* reiterates that young people are increasingly using their phones to gain knowledge via the Internet and through interaction with their peers on social networking sites (blogs, facebook, Mxit, etc). Therefore it makes sense to introduce learning through these devices. This scheme is being piloted in two schools (Technical High School and Thlabane Technical College) in the North West Province. Pupils using it will be able to access educational games and other content specifically created to meet the requirements of the national curriculum.

Generally, mobile phones with online services allow students to access multiple choice questions and answers, and partake in practical exercises. Mobile phones and podcasts also allow students to listen to audio content on the Web, subscribe to podcasts, obtain pre-loaded language tutorials, access recordings of diction sessions with native speakers, and access books, literature, TV/radio newscasts, assigned selections of music, and live recordings of rehearsals and concerts. Students listen to "mini lectures" via podcasting before class containing contextualized information about the readings, collections of audio lectures, and questions posed by the lecturer for students to consider before class. Edirisingha, Salmon, & Fothergill, (2006) state that pre-class podcasts contain news of the week, activities students are expected to do, and comments and feedback on assignments and activities.

The students that Son, Lee & Park (2004) approached at the Charles Sturt University opined that podcasts can be used to address their problems related to time management; how to follow the course content and take notes;

address their fear of missing content or not being around to talk to anyone; and clarify social aspects of the subject, assignment details and submission procedures. Campbell (2005) agrees by suggesting that students use podcasts to explain what they hope to accomplish in their presentations, and read aloud brief excerpts from the assigned readings to help others understand better. He further adds that professors are known to use podcasts to summarize journal articles related to the subject that they are dealing with. Chan & Lee (2005) posit that students also listen to podcasts before class in order to understand the background of the subject and the subject's terminology (e.g. computer or medical jargon). Podcasts are used as a strategy for addressing students' preconceptions and anxiety to better prepare them for effective one-to-one learning. The authors further suggest adding music to enhance pre-class listening materials, using podcasts for revision and reinforcement purposes, and sharing student-generated podcasts for knowledge construction.

6. Challenges facing the use of mobile phones and podcasts in teaching/learning

Various challenges emanate from using mobile phones for teaching/learning. One of the main problems is that they cannot operate without a network, which is also necessary to gain Internet access. The current generation of mobile devices is still constrained by a number of such factors (Hayes, 2004). Nevertheless, Csete, Wong & Vogel (2004) observe that current development projects are running at full speed to overcome these and other problems. The authors list some of the challenges and recommended solutions as follows:

· Non-ergonomic input method. Solutions might include voice recognition, projection keyboards, light pens and cursive hand writing recognition.
· The slow CPU speed, which can be overcome by a new breed of architecture for faster CPU's.
· Limited memory. This could be resolved by the expansion of the memory card and increasing internal RAM capacity.
· Limited battery span. The solution could be a new breed of lithium battery or the use of fuel cells in cellular phones.
· The need for the standardization of operating systems. As is common in almost any technological development (e.g. PC operating systems, video standards, etc), cellular companies and software companies compete aggressively, vying to ensure that theirs become the standard technology.
· Connectivity bandwidth. This could be overcome through the provision of 3G mobile capacity.
• Hayes, Joyce and Pathak (2004) also mention small screen size, which means small font size and lots of scrolling. The near future solution could be a flexible film display that can be folded out when needed.

172

7. Challenges of using podcasts

According to Bennet (2007), the challenges of using podcasts are:

- Technology adoption. While podcasting has been gaining popularity in recent years, it is still a relatively new technology when compared to others that have existed for at least a decade, such as websites and e-mail. The adoption of the technology is still far behind those of more mature channels. Rich media consumption, such as audio and video, only started gaining popularity after the availability of broadband and other fast Internet connections.
- Software installation. As podcasting becomes more mainstream, more software will be created to support it. Ideally, podcasts should eventually join other standard software on all desktop computers and laptops. Until then, there is still quite a long way to go before end users start fully using the technology.
- Content ideas. A podcast consists of episodes. As in radio or TV, this means that one needs to provide regular content for listeners to consume. Thus in order to get the most from a podcast, one must publish regularly to engage the listeners. The more they listen, the more they gain knowledge.
- Sales process. One must fit podcasting into the right moment in the process. Podcasts can be used to generate and nurture leads. They can also be used to generate sales and deliver products (such as electronic books, journals, etc) as long as they are in digital format.

8. Conclusion

The use of mobile technologies has taken flight in this century, leading institutions of higher learning to try to incorporate mobile technologies in teaching and learning, particularly through e-learning. Although the results of this study have not yet been fully analyzed, they are believed to provide an insight into whether or not mobile technologies (specifically mobile phones and podcasts) can be used for learning and teaching purposes at the University of Zululand. This viability study has suggested how it is possible to ease the way in which students use and gain access to lectures without any problems (that is if they have the necessary materials).

References

Kunguni, V. 2008 Computer Security, ITS Training Manager, University of Zululand: Kwa-Dlangezwa.

The University of Zululand 2008 available at http://www.uzulu.ac.za/Mission10.aspx Date visited 20 May 2008.

Wikipedia (2008). **Mobile phones**. Available http://www.wikipedia.org. Date visited 20 May 2008

Bennet T. (2007) *Podcasting Academic Tip Sheet.* [Online] Available at http://www.ecw.ac.au Date retrieved, 10 August 2008

Campbell, G. (2005). *There's Something in the Air: Podcasting in Education.* EDUCAUSE Review 40 (6), 32-47. [Online] Available at http://www.educause.edu/apps/er/erm05/erm0561.asp Date retrieved, 13 August 2008

Csete, J., Wong, Y. H. & Vogel, D. (2004). Mobile devices in and out of the classroom. **Mobile Device** Algebra application Video Internet …Educational task 19 In Cantoni & McLaughlin (eds.) *Proceedings of ED- MEDIA 2004,* Lugano, Switzerland.

Chan, A. & Lee, M.J.W. (2005) *An MP3 a day keeps the worries away: Exploring the use of podcasting to address preconceptions and alleviate pre-class anxiety amongst undergraduate information technology students*. In D.H.R. Spennemann & L.Burr (eds.) Good Practice in Practice: Proceedings of the Student Experience Conference (pp. 58-70). Wagga, NSW, September 5-7

Edirisingha, P., Salmon, G., & Fothergill, J. (2006). *Profcasting: a pilot study and a model for integrating podcasts into online learning.* A paper proposal for the EDEN 2006 research conference in Barcelona.

Hayes, P., Joyce, D. & Pathak P. (2004). Ubiquitous learning- an application of mobile technology in education. In Cantoni & McLaughlin (eds.) *Proceedings of ED-MEDIA2004,* Lugano, Switzerland.

Son, C., Lee, Y. & Park, S. (2004). *Towards New Definition of M-Learning*. Proceedings of ELEARN2004, pp. 2137-2140.

Thomas, K. (2005) *The power of the podcast.* http://www.futurelab.org.uk/viewpoint/art70.htm Date retrieved, 11 August 2008

"**The Communication Africa Journal**", *Uses of mobile phones in education* April/May 2008, Vol 11, Issue 2, page 14

Yuen, S.C.Y., & Wang, S.Y. (2004). *M-learning: Mobility in Learning*. Proceedings of ELEARN 2004, pp. 2248-2252.

A Comparison of the Research and Publication Patterns and Output of Academic Librarians in Eastern and Southern Africa from 1990 to 2006

Grace Sitienei [25]and Dennis N. Ocholla[26]
Department of Library and Information Science
University of Zululand, Private Bag, X1001, KwaDlangezwa 3886, South Africa
E-mail: docholla@pan.uzulu.co.za;graceterer@yahoo.com

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Abstract

This paper compares the research and publication patterns of academic librarians in Eastern and Southern Africa. The study confined its scope to publications produced between 1990 and 2006. The bibliometric technique and content analyses were used as a research method. Data was collected from two online databases. The results indicate that: (a) In terms of publications, Southern Africa (194; 76%) was more prolific than Eastern Africa (69; 24%); (b) South Africa was the most productive country with 111 (42.21%) publications; (c) The University of Botswana Library was the most prolific with 30 (11.41%) publications; (d) Muswazi from the University of Witwatersrand and Pienaar from the University of Pretoria were the most productive academic librarians (11; 3.97% publications each); (e) Academic librarians in Eastern Africa preferred publishing in the *Library review* journal, while Southern African academic librarians preferred the *Southern African Journal of Library and Information Science*; (f) The publication output of the two regions depicted an inconsistent up-down trend during this period; (g) The main subject area of librarians in Southern Africa was Bibliography, and in Eastern Africa, Information Technology; (h) Most academic librarians from both regions preferred publishing individually; and (i) The most published type of document in both regions was articles.

1 Introduction and conceptual framework

The term 'research' has been defined in many ways by a number of authors, and of these, the simplest is perhaps Neuman's (2006:2) assertion that it is a way of going about finding answers to questions. Leedy in Aina (2002:1) goes further to state that research "is the manner in which we attempt to solve problems in a systematic effort to push the frontiers of

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[25] Grace Sitienei is a Librarian at Eldoret Polytechnic, Eldoret, Kenya, and has completed her Masters work in the Department of Library and Information Science, University of Zululand, South Africa

[26] Dennis N.Ocholla, PhD, is Professor and Head of the Department of Library and Information Science, as well as the Vice–Dean Faculty of Arts, University of Zululand, South Africa. He was the supervisor of the research project.

human ignorance or confirm the validity of the solutions to problems others have presumably solved".

Research therefore has significant personal, sociological and economic benefits in fields such as medicine, agriculture, business, the military, law, commerce, and academics. Goddard and Melville (2001:1) believe that without research, we would be nude, homeless and penniless, because everything we know now had to be discovered by someone at some point in time. In terms of personal growth or development, Houghton's article, *Career review part 3: the importance of research* in Career Focus (2006, par.1), cited research as a key player in helping individuals achieve the career of their dreams, while the editor of The Sowetan (2008) more generally wrote an article entitled and explaining why *Research is the key to success*. Aceto (2005, what are the benefits of research to a university? section, par.1) states that the career benefits of research are countless, ranging from an increased ability to attract highly qualified and motivated members of staff (both nationally and internationally), to having a greater advantage over competitors in gaining and maintaining research funds, better chances of 'rubbing shoulders' with the very best, and creating a more stimulating working environment for all involved.

Research is carried out all over the world and in all sectors of society. Goddard and Melville (2001:3) reveal that in South Africa, the southern–most country in Africa, research is carried out in all sectors of the economy (cultural, scientific, medical etc.) in institutions such as museums, universities, technikons, industry research laboratories, and councils such as CSIR, HSRC, MRC and various state departments. Because of the significance attached to research and publication in all sectors of the various institutions, academic librarians in public universities should also be expected to carry out research. It may be surprising to most to hear of librarians engaging in research, because people generally believe that librarians confine themselves to shelving, checking books in and out, and classifying and cataloguing books in the library. But Verzosa (2007) believes that it is very important for librarians to engage in research as this adds value to librarianship. She laments the fact that research in librarianship, particularly within the Philippines, is disappointing; and although it is evident that there is an abundance of well educated, well trained professionals, there is an unfortunate shortage of research–oriented librarians. The same may or may not apply to academic librarians in Africa. Research and research publications compliment each other, meaning that academic librarians should not only engage in research, but also publish the outcome of their research in order for others to gain access.

The DEST HERDC Specification for the collection of 2006 data (DEST HERDC, 2008, para.1.3.10) defines research publications as books, book chapters, journal articles and/or conference publications that meet the definition of research, and are characterized by: substantial scholarly activity, as evidenced by the discussion of the relevant literature; an awareness of the history and antecedents of the work described; a format (in terms of presentation) that allows a reader to trace the sources of the work through citations and footnotes; originality, portrayed by not being a compilation of existing works; content that increases the stock of knowledge; a form that enables the dissemination of knowledge; and attempts to improve the quality of publications.

The Royal society of New Zealand (RSNZ, n.d.para.1) website adds that research publications must: i) maintain scientific self respect; ii) complete the scientific process; iii) be a clear measure of productivity; iv) promote the sense of a scientific community, and; iv) preserve knowledge.

2   Problem statement

An academic librarian supports members of an academic community, such as students, researchers and lecturing staff; by managing, organizing, evaluating and disseminating the information they need. Publishing or creating information has not been part of academic librarians' resume. Stover (1996, par.2) believes that it is vital for academic librarians to be involved in publishing in order to support the scholarly communication process. Gregory and Medford (2006, par.1) maintain that academic librarians would also benefit a great deal from publishing because it allows them to maintain their faculty status, obtain promotions, and gives them the opportunity to add to the body of knowledge that goes into creating our literature. Bahr and Zemon (2000: 411), and Hart (1996: 455) have observed that academic librarians in the West publish a lot, and in some institutions, publication is actually a requirement for promotion. In order for academic librarians to carry out research, financial support, designated time to do research and rewards for completing research in time should be provided as incentives that entice librarians to continue with research, and compel others to begin. However in Africa, not much is presently known about the nature and pattern of publishing by academic librarians.

This study thus sought to establish and compare the research and publication patterns and output of academic librarians in Eastern and Southern Africa from 1990 to 2006. The main objectives of the study were as follows:
- To establish why academic librarians publish;

178

- To establish the quantity of publishing;
- To determine where academic librarians publish;
- To study the publishing trend of academic librarians;
- To examine what academic librarians publish; and
- To determine the level of collaboration;

3. Research method and Procedure

Goddard and Melville (2001:16) define a research method as a way of specifying how one can go about finding solutions to problems and what steps should be taken in order do so. This study employs bibliometrics as its research method. Twining (2002:70) states that bibliometrics is a method that utilizes quantitative analysis and statistics to investigate, among other aspects of information, patterns of the information-knowledge transfer process. It is based on the enumeration of scientific data in the form of articles, publications, patents and citations. Bibliometrics' uses range from determining the level and nature of collaboration between scientists and disciplines, to examining cognitive (i.e. human, mechanical, and neural network) development.

The study targeted all academic librarians that were holding a bachelors degree and above and who, at the time of study, were employed in Eastern and Southern African public university libraries. Where the degree was not indicated, those designated as librarians (e.g. assistant librarians, sub-librarians, etc) were sampled for the study. A total of 866 academic librarians were included in the study. Of these, 755 were from Southern Africa and 111 were from East Africa. Similarly, the study focused on public academic libraries found in the Eastern and Southern regions of Africa. In Eastern Africa, it covered Ethiopia, Kenya, Tanzania, Somalia, Sudan and Uganda. Countries covered in Southern Africa were Botswana, Malawi, Lesotho, Namibia, South Africa, The Kingdom of Swaziland, Zambia, and Zimbabwe. A total of 47 academic libraries were sampled from these regions. 14 were from the East African region, and 33 were from Southern Africa.

The study also employed content analysis in its data collection. Content analysis is defined by Wilkinson and Birmingham in Krippendorff (2003:68) as a research technique that makes replicable and valid inferences from data to a study's content. The documents studied were online journals, printed journals, books and journal articles (e.g. *Libri* articles). Search engines were used to access electronic documents, and other documents sourced for content analysis were obtained from two online databases (i.e.

LISTA and WORLDCAT). The names of academic librarians were retrieved from their respective academic library websites and used as keywords for retrieving data from the two online databases.

Microsoft Excel was used to analyze and present data in the form of tables, charts and graphs.

4   Results

The findings are represented in sections 4.1 to 4.9 below.

4.1 Why academic librarians should publish

Poynter (1979:14), Marjorie (2000, par.5), Curran (1990: 9), Thyer (1994:3), Stover (1996, the value of the librarians as publishers on the web section) and Library Connects (2003) believe that academic librarians could reap the following benefits if they engaged in research:

- Research would give an academic librarian recognition both nationally and internationally;
- It would offer professional recognition to the academic librarian from colleagues and peers. For example, they may be called upon to speak at functions;
- The academic librarian would have reason to be proud, in that s/he has been published, and that someone somewhere has cited his or her work;
- The academic librarian would add to the body of knowledge that goes into creating our professional literature;
- Publication leads to invitations to conferences and symposiums;
- Research publications could be used to rate academic librarians when the need for promotion arises;
- It could lead to further careers, for example in teaching or consultancy, for the academic librarian;
- Academic librarians would gain financially from publishing;
- Publishing could result in the promotion and recognition of one's department/institution based on publication output;
- It would provide continued tenure for the academic librarian;
- The academic librarian would become competitive in the publishing world;
- The academic librarian can keep score through publishing;

180

- It would be of significant importance in the academic librarian's resume;
- The academic librarian would have left his/her ideas behind for others to consider; and
- He/she would be able to impart research skills onto others who wish to publish.

4.2 Most productive region and country

A total of 263 publications were retrieved. The results in Figure 1 below indicate that the most prolific region was Southern Africa with 194 (76%) publications. Eastern Africa only recorded 69 (26%) publications.

Figure 1: Distribution of publication by geographical region

Eastern Africa, 26%

Southern Africa, 74%

181
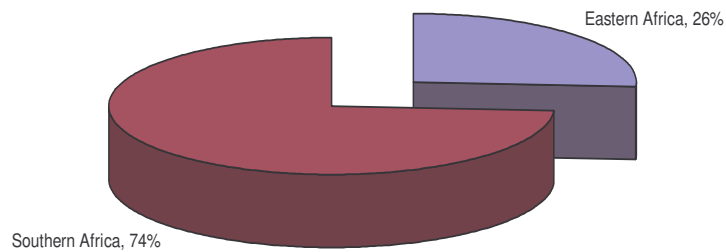
Figure 2 below indicates that South Africa emerged as the most prolific country in this study with 111 (42.21%) publications. Tanzania came second with 31 (11.41%), followed by Botswana (30; 11.41%), Kenya (29; 11.03%), Zambia (14; 5.32%), Namibia and Lesotho (11; 4.18%), Malawi (9; 3.42%), Uganda (8; 3.04%), Swaziland (5; 1.90%), Zimbabwe (3; 1.14%) and Ethiopia (1; 0.38%). Somalia and Sudan both had 0 (0.00%) publications.

Figure 2: Distribution of publications by country
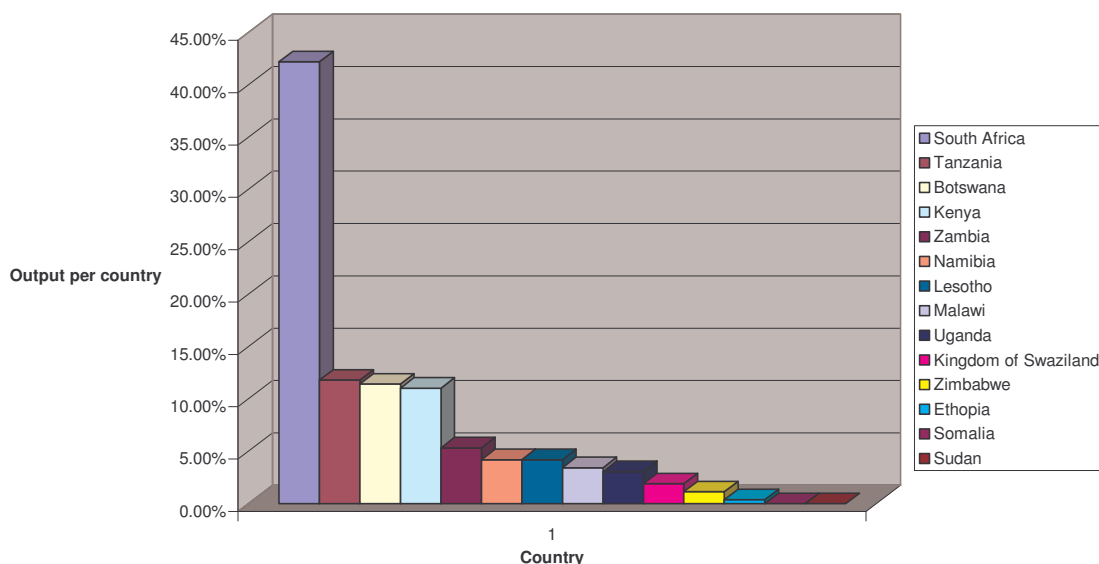
Arguably, Southern Africa's accomplished performance could be attributed to South Africa, which boosted the region. South Africa was probably more prolific because:

- It has a strong and sound research policy.
- Funds are always made available to academic librarians who wish to carry out research.
- The country is politically stable.
- Many universities offer the course. Therefore the country could produce more research–oriented academic librarians than the rest of the countries in the study.

Performance in countries such as Zimbabwe, Sudan and Somalia was most likely affected by political instability. Proof of this lies in the fact that South Africa, Botswana and Tanzania have, in the study's time frame, been the most stable countries, and correspondingly enjoyed good performances.

South Africa and Botswana could additionally attribute their good performances to strong economies, which are lacking in most of the countries in the two regions.

Another reason probably affecting the publication performance of countries such as Ethiopia, Kenya, Lesotho, Namibia, Malawi, Swaziland, Zimbabwe, Uganda, Somalia and Sudan is the issue of Diaspora, whereby many intellectuals are migrating to other countries of the world because of push factors such as unemployment, poor remuneration, lack of academic freedom, and poor government policies. This affects many professions, including Library and Information Science. For instance, the Africa News update website (2005; par.1) highlighted that between 500,000 and 1.8 million Kenyans work overseas, making it the most brain-drained country in the region. This could mean that many academic librarians living abroad probably publish outside the country. There is also the possibility that Library and Information Science is not given high priority because it is not considered to be a science/ technology course. Funds are therefore channeled to other areas, such as medicine, agriculture, and the pure and applied sciences. Furthermore, many academic librarians probably do not get incentives and motivation, such as promotion, recognition, funding and sabbatical leave, to carry out research. On top of this, there could be the lack of a sound research policy, which results in the neglect of the findings suggested by professionals in this field.

The fact that the databases may not have indexed all the publications cannot be ruled out, particularly because in the course of data collection from the LISTA and WORLDCAT databases, there was a great difference in the total number of publications retrieved.

4.3 Most productive academic libraries

The University of Botswana Library in Southern Africa came out on top with 30 (11.41%) publications. The next nine prolific academic libraries, in descending order, were from the University of Cape Town in Southern Africa (25; 9.51%); the University of Dar es salaam in Eastern Africa (22; 8.37%); the University of Pretoria in Southern Africa (19; 7.22%); the University of Witwatersrand (18; 6.84%), the University of Namibia and the University of Lesotho in Southern Africa (11; 4.18% each); the University of Zambia in Southern Africa (10; 3.80%); and the Sokoine University of Agriculture and Moi University in Eastern Africa (9; 3.42% publications each) [see Table 1].

A closer look at the top universities reveals that they have existed for a long time, and are probably more stable than other universities in terms of

government funding. Some of these institutions were also the first academic institutions of higher learning in their countries, e.g. the University of Botswana, University of Dar es salaam, and the University of Namibia. Another factor worth noting is that three of the academic libraries from South Africa that featured in the top ten were from universities that had been designated as 'white-only' during the apartheid era. These are the University of Cape Town, University of Pretoria and the University of Witwatersrand. However, academic libraries from universities that were designated 'black-only' performed poorly, such as the University of the Western Cape (0; 0.00%), the University of the North–West (2; 0.76%), the University of Zululand (3; 1.90%) and the University of Venda (0; 0.00%). In all likelihood, former 'white-only' academic libraries performed well because of access to better resources and funding, which they continued to enjoy once apartheid was banished. In contrast, survival was probably the main focus in black-designated libraries, which suffered from poor resources in the years preceding and immediately following democratic independence.

Eastern Africa's Sokoine University of Agriculture Library probably made the top ten because it is in an agricultural-based university, and therefore enjoys the funding that goes with the importance placed on agriculture in the region. In a similar position is the Egerton University Library, which took twelfth position with 7 (2.66%) publications.

It is interesting to note that the top ten libraries, i.e. libraries hailing from the University of Botswana, the University of Cape Town, the University of Dar es salaam, the University of Pretoria, the University of Namibia, the University of Zambia, Moi University, Makerere University, Egerton University and Nairobi University; were in institutions that offer the Library and Information Science course. It is highly likely that the academic librarians from these universities were getting support in terms of skills and funding from the Library and Information Science department.

TABLE 1: Distribution of publications by academic libraries

Number = 263

No.	Academic libraries	Region	Frequency	%
1	University of Botswana Library	Southern Africa	30	11.41%
2	University of Cape Town Library	Southern Africa	25	9.51%
3	University of Dar es Salaam Library	Eastern Africa	21	7.98%
4	University of Pretoria Library	Southern Africa	19	7.22%
5	University of Witwatersrand Library	Southern Africa	18	6.84%
6	University of Namibia Library	Southern Africa	11	4.18%
7	University of Lesotho Library	Southern Africa	11	4.18%
8	Sokoine University of Agriculture Library	Eastern Africa	10	3.80%
9	Moi University Library	Eastern Africa	10	3.80%
10	University of Zambia Library	Southern Africa	9	3.42%
11	Makerere University Library	Eastern Africa	8	3.04%

184

12	Egerton University Library	Eastern Africa	7	2.66%
13	University of Nairobi Library	Eastern Africa	6	2.28%
14	Masinde Muliro University of Science and Technology Library	Eastern Africa	6	2.28%
15	University of Malawi Library	Southern Africa	6	2.28%
16	University of Free State Library	Southern Africa	6	2.28%
17	University of Kwa Zulu Natal Library	Southern Africa	6	2.28%
18	Tshwane University of Science and Technology	Southern Africa	6	2.28%
19	UNISA	Southern Africa	5	1.90%
20	University of Rhodes Library	Southern Africa	5	1.90%
21	University of Swaziland Library	Southern Africa	5	1.90%
22	Copperbelt University Library	Southern Africa	5	1.90%
23	University of Fort Hare Library	Southern Africa	5	1.90%
24	Durban University of Technology	Southern Africa	4	1.52%
25	University of Mzuzu Library	Southern Africa	3	1.14%
26	University of Limpopo Library	Southern Africa	3	1.14%
27	University of Stellenbosch Library	Southern Africa	3	1.14%
28	University of Zululand Library	Southern Africa	3	1.14%
29	University of Zimbabwe Library	Southern Africa	3	1.14%
30	CPUT Library	Southern Africa	2	0.76%
31	University of Johannesburg Library	Southern Africa	2	0.76%
32	Alemaya University of Agriculture Library	Eastern Africa	1	0.38%
33	University of North – West Library	Southern Africa	1	0.38%
34	Vaal University of Technology Library	Southern Africa	1	0.38%
35	Somalia National University Library	Eastern Africa	0	0.00%
36	Kenyatta University Library	Eastern Africa	0	0.00%
37	Mzumbe University Library	Eastern Africa	0	0.00%
38	Open University of Tanzania Library	Eastern Africa	0	0.00%
39	University of Khartoum Library	Eastern Africa	0	0.00%
40	University of Venda Library	Southern Africa	0	0.00%
41	Central University of Technology Free State	Southern Africa	0	0.00%
42	Mangosuthu Technikon Library	Southern Africa	0	0.00%
43	Nelson Mandela Metropolitan University Library		0	0.00%
44	Walter Sisulu University of Science and Technology Library	Southern Africa	0	0.00%
45	University of Western Cape Library	Southern Africa	0	0.00%
46	Midlands State University Library	Southern Africa	0	0.00%
47	Zimbabwe Open University Library	Southern Africa	0	0.00%
	TOTAL		**263**	**100%**

4.4 Most productive academic librarian

Data from Table 2 below indicates that a total of 32 academic librarians contributed to 75 publications in Eastern Africa. In Southern Africa, 90 academic librarians contributed 202 publications. Two academic librarians from Southern Africa emerged as the most prolific in the two regions, and these were Muswazi from the University of Witwatersrand Library and Pienaar from the University of Pretoria Library, each with 11

185

(3.97%) publications. In Eastern Africa, academic librarians who recorded more than five publications were Msuya and Nawe, both from the University of Dar es salaam, with 7 (2.53%) publications each; and Dulle from the Sokoine University of Agriculture, Arap Tirong from Moi University and Nyamboga from Egerton University with 6 (2.17%) publications each.

Academic librarians from Southern Africa with a record of more than five publications, other than Muswazi and Pienaar, were Ojedokun from the University of Botswana (9; 3.25%); Darch from the University of Cape Town (8; 2.89%), and Westhuizen from the University of Pretoria (7; 2.53%). They were followed by Moshoeshoe–Chadzingwa from the University of Lesotho and Chifwepa from the University of Zambia (7; 2.53% each); Lumande from the University of Botswana (6; 2.17%); and Gwenda from the University of Rhodes and Swanepoel from the Tshwane University of Technology (5; 1.81% each). Academic librarians from Southern Africa therefore occupied the first four overall positions. The top 7 most prolific academic librarians came from institutions that have existed for a long time. However, it is possible that some academic libraries performed poorly because their most productive academic librarians moved to other libraries in search of greener pastures. For example, Muswazi moved from the University of Swaziland to the University of Witwatersrand, and Shibanda moved from Moi University to the Masinde Muliro University of Science and Technology.

Only 23 Library Directors from the 46 academic libraries published and conducted research. These Directors were: Nawe, Arap Tirong, Dulle, Mwanzilo, Dulle, Musoke, Shibanda, Mammo, Rapp, Gwenda, Tise, Ubogu, Sander, Swanepoel, Namhila, Phiri, Uta, Larney, Chuene, Lungu, Buchanan, Moshoeshoe–Chadzingwa, Chikonzo and Namponya.

The study also confirms Lokta's law and Yatiz and Zainab's (2007: 41) study, both of which established that most academic librarians are one time contributors. Of the 32 academic librarians in Eastern Africa, half (16) were one time contributors, while in Southern Africa, 51 out of the 90 academic librarians were one time contributors.

Table 2: Distribution of publication by academic librarians

N= 271

Eastern Africa Region					Southern Africa Region				
	WORLDCAT & LISTA DATABASE				WORLDCAT & LISTA DATABASE				
No.	Name	Library	Fq	%	No.	Name	Library	Fq	%
1	Msuya	University of Dar es salaam	7	2.53%	1	Muswazi	University of Witwatersrand	11	3.97%
2	Nawe	University of Dar es salaam	7	2.53%	2	Pienaar	University of Pretoria	11	3.97%
3	Dulle	Sokoine	6	2.17%	3	Ojedokun	University of	9	3.25%

		University of Agriculture					Botswana		
4	Arap Tirong	Moi University	6	2.17%	4	Darch	University of Cape Town	8	2.89%
5	Shibanda	Masinde Muliro University of Science and Technology	6	2.17%	5	Westhuizen	University of Pretoria	7	2.53%
6	Nyamboga	Egerton University	6	2.17%					
7	Musoke	Makerere University	3	1.08%	6	Moshoeshoe - Chadzingwa	University of Lesotho	7	2.53%
8	Inoti	Nairobi University	2	0.72%	7	Chifwepa	University of Zambia	7	2.53%
9	Were	Nairobi University	2	0.74%	8	Lumande	University Botswana	6	2.17%
10	Liyai	Nairobi University	2	0.72%	9	Gwenda	University of Rhodes	5	1.81%
11	Khamadi	Moi University Library	2	0.72%	10	Swanepoel	Tshwane University of Technology	5	1.81%
12	Mulimila	Sokoine University of Agriculture	2	0.72%	11	Nfila	University of Botswana	4	1.44%
13	Manda	University of Dar es salaam	2	0.72%	12	Kgosiemang	University of Botswana	4	1.44%
14	Nkhoma Wamunza	University of Dar es salaam	2	0.72%	13	Ngwira	University Malawi	4	1.44%
15	Lwehabura	Sokoine University of Agriculture	2	0.72%	14	Namponya	University Free State	4	1.44%
16	Omona	Makerere University	2	0.7%	15	Fidzani	University of Botswana	3	1.08%
17	Mammo	Alemaya University of Agriculture	1	0.36%	16	Uta	University of Malawi	3	1.08%
18	Matanji	University of Nairobi	1	0.36%	17	Caroline	University of Cape Town	3	1.08%
19	Musisi - Edebe	Moi University	1	0.36%	18	Dubbeld	University of Kwa Zulu Natal	3	1.08%
20	Wanyama	Moi University	1	0.36%	19	Marais	UNISA	3	1.08%
21	Kiloi	Moi University	1	0.36%	20	Myers	University of Kwa Zulu Natal	3	1.08%
22	Bii	Moi University	1	0.36%	21	Anbu	University of Swaziland	3	1.08%
23	Odini	Moi University	1	0.36%	22	Lungu	Copperbelt University	3	1.08%
24	Mwanzil	Egerton	1	0.36%	23	Oladokun	University of	2	0.72%

	o	University						Swaziland		
25	Lwoga	Sokoine University of Agriculture	1	0.36%	24	Rao	Copperbelt University	2	0.72%
26	Kiondo	University of Dar es salaam	1	0.36%	25	Jain	University of Botswana	2	0.72%
27	Kabudi	University of Dar es salaam	1	0.36%	26	Taole	University of Botswana	2	0.72%
28	Matovelo	Sokoine University of Agriculture	1	0.36%	27	Hansmann	University of Botswana	2	0.72%
29	Busagala	Sokoine University of Agriculture	1	0.36%	28	Morgenstern	University of Lesotho	2	0.72%
30	Lutwama	Makerere University	1	0.36%	29	Namhila	University of Namibia	2	0.72%
31	Kakai	Makerere University	1	0.36%	30	Barrat	University of Namibia	2	0.72%
32	Kakembo	Makerere University	1	0.36%	31	Thomson	University of Namibia	2	0.72%
		TOTAL	**75 27**	**100%**	32	Amoah	University of Cape Town	2	0.72%
					33	Arko-Cabbah	University of Cape Town	2	0.72%
					34	Tise	University of Stellenbosch	2	0.72%
					35	Nicholson	University of Witwatersrand	2	0.72%
					36	Mgobozi	University of Zululand	2	0.72%
					37	Chimfwembe	Copperbelt University	2	0.72%
					38	Makondo	University of Zambia	2	0.72%
					39	Chikonzo	University of Zimbabwe	2	0.72%
					40	Oosthuizen	University of Fort Hare	1	0.36%
					41	Raju	University of Kwa Zulu Natal	1	0.36%
					42	Buchanan	University of kwa Zulu Natal	1	0.36%
					43	Khun	University of Free State	1	0.36%
					44	Darries	CPUT	1	0.36%
					45	Rolf	CPUT	1	0.36%
					46	Herbert	Durban University of Technology	1	0.36%

[27] Total number of contributions by all academic librarians including those who collaborated

						47	Muller	Durban University of Technology	1	0.36%
						48	Thomas	Durban University of Technology	1	0.36%
						49	Latsky	University of Johannesburg	1	0.36%
						50	Sander	University of Johannesburg	1	0.36%
						51	Shokane	University of Limpopo	1	0.36%
						52	Chuene	University of Limpopo	1	0.36%
						53	Bopape	University of Limpopo	1	0.36%
						54	Larney	University of North - West	1	0.36%
						55	Hammes	University of Pretoria	1	0.36%
						56	Van Eeden	UNISA	1	0.36%
						57	Retief	UNISA	1	0.36%
						58	Englebretcht	University of Stellenbosch	1	0.36%
						59	Sieberhagen	Tshwane University of Technology	1	0.36%
						60	Mahlangu	Vaal Uiversity of Technology	1	0.36%
						61	Ubogu	University of Witwatersrand	1	0.36%
						62	Jiyane	University of Zululand	1	0.36%
						63	Morupisi	University of Botswana	1	0.36%
						64	Dintwe	University of Botswana	1	0.36%
						65	Esilaba	University of Botswana	1	0.36%
						66	Kakoma	University of Lesotho	1	0.36%
						67	Chiwaya	University of Malawi	1	0.36%
						68	Phiri	University of Malawi	1	0.36%
						69	Van Roi	University of Namibia	1	0.36%
						70	Sturges	University of Namibia	1	0.36%
						71	Katjihigwa	University of Namibia	1	0.36%
						72	Mchombu	University of	1	0.36%

									Namibia			
							73	Visagie	University of Namibia	1	0.36%
							74	Ohene	University of Namibia	1	0.36%
							75	Awuku	University of Namibia	1	0.36%
							76	Khangala	University of Cape Town	1	0.36%
							77	Omar	University of Cape Town	1	0.36%
							78	Sales	University of Cape Town	1	0.36%
							79	Rapp	University of Cape Town	1	0.36%
							80	Barben	University of Cape Town	1	0.36%
							81	Lesley	University of Cape Town	1	0.36%
							82	Walter	University of Cape Town	1	0.36%
							83	Thomson	University of Cape Town	1	0.36%
							84	Visser	University of Cape Town	1	0.36%
							85	Yumba	University of Swaziland	1	0.36%
							86	Ngcobo	University of Swaziland	1	0.36%
							87	Banda	Copperbelt Universsity	1	0.36%
							88	Nkhoma	Copperbelt Universsity	1	0.36%
							89	Sibanda	University of Zimbabwe	1	0.36%
								TOTAL		**201**[28]	**100%**

4.5   Most popular journal

The popularity of a journal in the two regions was measured by the number of times any academic librarian's publication had appeared in the journal. In Eastern Africa, academic librarians tended to publish in 35 journals. Most (11; 4.18%) of the librarians in this region preferred publishing in *Library Review*; followed by the *Quarterly Bulletin of International Association of Agricultural Information Specialist* and the *Information and*

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[28] Total number of contributions by all academic librarians including those who collaborated

Development Journal, both in second place with 6 (2.28%) publications. The IFLA Journal had 5 (1.90%) publications.

Southern African academic librarians published in 80 journals. Most (23; 8.75%) of the publications were in the *Southern Africa Journal of Library and Information Science*. Others were *Information Development* (10; 3.80%); the *African Journal of Library* and *Information Science* (8; 3.04%); and *Information Management* and the *International Information and Library Review Journal,* both with 7 (2.66%) publications. Seven journals published a total of 6 (2.28%) publications each, namely *Veterinary Science Library, International Journal of Legal Information, IFLA Journal, Library Management, Mousaion, University of Cape Town* and *The Electronic Library Journal.* These results illustrate that academic librarians in Southern Africa preferred publishing at home, and East African academic librarians preferred publishing in foreign journals. East African academic librarians probably did so because they lack(ed) regional journals that focus on this discipline.

Bradford's law, also known as Bradford's law of scattering or Bradford's distribution, was developed by a science librarian called Samwel Clement Bradford, and is one of the most important laws of bibliometrics. In order to test the law, the grouping was done as suggested by Bradford, i.e. in Eastern Africa, zone one constituted journals which published over 10 publications, zone two was journals with between 6 to 12 articles, and zone three covered journals that had published only 1 publication. In Southern Africa, zone one covered journals that had between 10 to 23 publications, zone two was journals with 8 to 2 publications, and zone three was journals with only 1 publication. The total numbers in proportion to the three zones were 1: 9: 25 for Eastern Africa and 2: 28: 50 for Southern Africa. This confirms the fact that it is not always the case that core journals contain 30% of the total number of articles. While it was found that the law applied to Southern Africa, this wasn't the case in Eastern Africa, where articles in core journals were less than 30%.

Table 3: Distribution of publications in journals
N = 263

Eastern Africa region				Southern Africa region			
WORLDCAT and LISTA Database				WORLDCAT and LISTA Database			
No.	Journal	Fq	%	No.	Journal	Fq	%
1	Library Review	11	4.18%	1	South African Journal of Library and Information Science	23	8.75%
2	Quarterly Bulletin of International Association of Agricultural Information Specialist	6	2.28%	2	Information Development	10	3.80%

3	Information Development	6	2.28%	3	African Journal of Library and Information Science	8	3.04%
4	IFLA Journal	5	1.90%	4	Information Management	7	2.66%
5	Information Management	4	1.52%	5	The International Information and Library Review	7	2.66%
6	Library Management	3	1.14%	6	Vetenary Science Library (University of Pretoria)	6	2.28%
7	Health Libraries Review	3	1.14%	7	International Journal Of Legal Information	6	2.28%
8	New Library World	2	0.76%	8	IFLA Journal	6	2.28%
9	SRELS Journal of Information Management	2	0.76%	9	Library Management	6	2.28%
				10	Mousaion	6	2.28%
10	Journal of Information Science	2	0.76%	11	The Electronic Library	5	1.90%
11	Journal of Inter Library Loan and Document Delivery	1	0.52%	12	University of Cape Town	5	1.90%
12	Campus Wide Information System	1	0.52%	13	South African Centre for Cooperation in Agricultural Research and Training	4	1.52%
13	Oxford publishers	1	0.52%	14	University of Pretoria	4	1.52%
14	Eldoret SCANUL (ECS)	1	0.52%	15	Library Review	4	1.52%
15	Malaysian Journal of Library and Information Science	1	0.52%	16	Quarterly Bulletin of National Library of South Africa	3	1.14%
16	Electronic Library and Information System	1	0.52%	17	Libri	3	1.14%
17	DESIDOC	1	0.52%	18	Program: Electronic Library and Information Systems	3	1.14%
18	Kenyan Economic Association	1	0.52%	19	Library Hi Tech Journal	3	1.14%
19	Centre for Law Research International	1	0.52%	20	Journal of Academic Librarianship	3	1.14%
20	Library and Archival Security	1	0.52%	21	Cataloguing and Classification Quarterly Journal	3	1.14%
21	African Journal of Library and Information Science	1	0.52%	22	IATUL Annual Conference Proceedings	3	1.14%
22	Libri: International Journal of Library and Information Science	1	0.52%	23	National Library of Namibia	2	0.76%
23	Journal of Information Technology	1	0.52%	24	Information Studies Journal	2	0.76%
24	Berlin Koster	1	0.52%	25	University of Natal	2	0.76%
25	University of Dar es Salaam	1	0.52%	26	For Full Text	2	0.76%
26	University of North Carolina at Chapel Hill	1	0.52%	27	UNISA	2	0.76%
27	Tanzania Library Association	1	0.52%	28	National University of Lesotho	2	0.76%
28	Dar es Salaam SCESCAL Ten	1	0.52%	29	Boston Spa, British Library	2	0.76%

29	Information Technology for Development Journal	1	0.52%	30	Cape Librarian	2	0.76%
				31	National AIDS Coordinating Agency, University of Botswana	1	0.38%
30	Springer Verlag	1	0.52%	32	Campus Wide Information Systems	1	0.38%
31	South African Journal of Librarianship and Information Science	1	0.52%	33	Education for Information	1	0.38%
32	Journal of Librarianship and Information Science	1	0.52%	34	International Information Review	1	0.38%
33	World Libraries	1	0.52%	35	Institute of Southern African Studies (National University of Lesotho)	1	0.38%
34	The Department of Women, Kampala	1	0.52%	36	Lesotho Library Association	1	0.38%
35	Uganda Library Association	1	0.52%	37	Maseru	1	0.38%
	TOTAL	**69**	**100%**	38	Library and Information Update	1	0.38%
				39	Legal Information Management Journal	1	0.38%
				40	Collection Development	1	0.38%
				41	College Research Libraries	1	0.38%
				42	Chandos	1	0.38%
				43	South African Institute of International Affairs	1	0.38%
				44	Malherbe Library	1	0.38%
				45	National Museum Council	1	0.38%
				46	University of Johannesburg	1	0.38%
				47	Eric	1	0.38%
				48	Information Outlook	1	0.38%
				49	INSPEL	1	0.38%
				50	African Research Documentation	1	0.38%
				51	Sub – Saharan African Program	1	0.38%
				52	MALICO	1	0.38%
				53	FAO Fisheries	1	0.38%
				54	Malawi Library Association	1	0.38%
				55	International Journal of Information and Library Research	1	0.38%
				56	APLESA	1	0.38%
				57	Zomba Malawi	1	0.38%
				58	ASLIB Proceedings	1	0.38%
				59	Journal of Documentation	1	0.38%
				60	INSPEL	1	0.38%
				61	National Archives of Namibia	1	0.38%

				62	Social Science Division, Multi Disciplinary Research Centre	1	0.38%
				63	Clio Press	1	0.38%
				64	The Reference Librarian	1	0.38%
				65	Library Consortia Management	1	0.38%
				66	University of Stellenbosch	1	0.38%
				67	Library and Information Workers Association	1	0.38%
				68	Science and Technology Libraries	1	0.38%
				69	Interlending and Document Supply	1	0.38%
				70	Rand Afrikaans University	1	0.38%
				71	University of Zululand	1	0.38%
				72	Electronic Journal of Academic and Special Librarianship	1	0.38%
				73	Journal of Society of Archivist	1	0.38%
				74	Digital Libraries	1	0.38%
				75	Kepro Bulletin	1	0.38%
				76	The Project	1	0.38%
				77	Malayasian Journal of Library and Information Science	1	0.38%
				78	University of Botswana	1	0.38%
				79	African Journal of Librarianship	1	0.38%
				80	Oxford	1	0.38%
					TOTAL	**194**	**100%**

4.6 Distribution of publications by type of document

Figure 3 below illustrates that of the 69 publications in Eastern Africa, 58 (22.05%) were articles, 5 (1.90%) books, 5 (4.56%) conference proceedings, 1 (0.38%) microform and 0 (0.00%) theses or book reviews. Southern Africa had 194 publications, 136 (51.71%) of which were articles, 26 (9.89%) books, 11 (4.18%) theses, 9 (3.42%) book reviews, 12 (4.56%) conference proceedings and 0 (0.00%) microforms.

194

Figure 3: Distribution of publications by type of documents
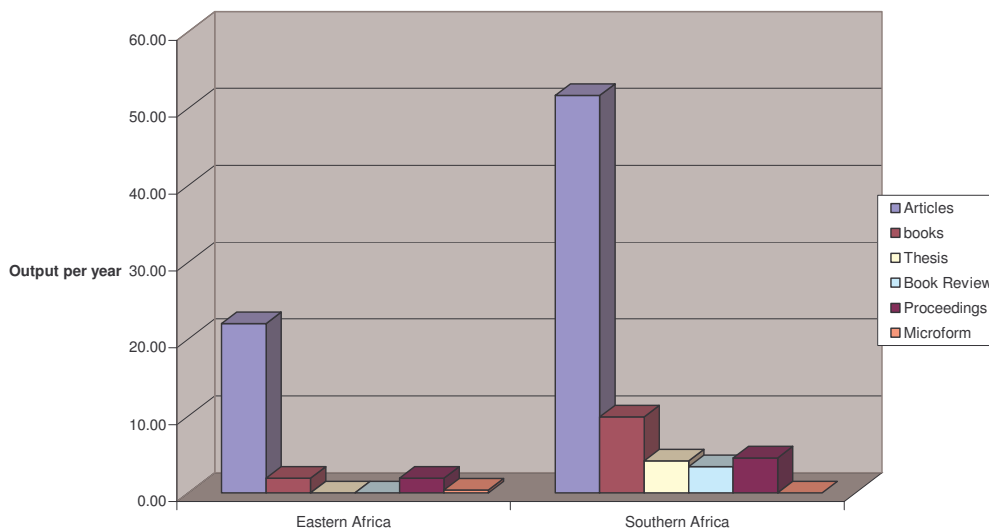
## 4.7   Research trend in Eastern and Southern Africa

The publication trends of the two regions under study, illustrated in Figure 4 below, show that from 1990 to 2006, the number of publications was inconsistently increasing and decreasing. Southern Africa's publication output was only steady once from 1998 to 1999, where the number of publications remained at 13 (4.94%). Eastern Africa had a steady publication trend from 1997 to 1998, where the publication output was 4 (1.52%). In 1992 and 1995, the publication output was 0.00% in Southern Africa and in Eastern Africa respectively. This unsteady trend could be attributed to a lack of funds during the specified periods.

Elections and referendums also seem to affect the output of publications in the two regions, perhaps because when an election or a referendum is held all funds are geared towards these events. However, this was not the case in some years where there was a drop in output. For instance, it is possible that East Africa's output dropped in 1993 because Kenya had an election in the previous year; in 1995 the output dropped once more, and this may have been due to Tanzania's election; and in 2005, Kenya and Uganda had a referendum and Tanzania had an election. Similarly in South Africa, publication output dropped in 1992, possibly because South Africa had a referendum during that year; in 1994, Botswana, South Africa, Malawi and Namibia held their elections; and in 1996, Zambia and Zimbabwe had their elections.

195

However, despite elections in South Africa, Malawi and Namibia in 2004, the output rose, but then dropped the following year, probably due to the strain on funds caused by the previous year. The same scenario occurs in East Africa, whereby although Uganda held an election in 2006, the publication output rose. Kenya also held an election in 1997 with an increase in its publication output.

The independence of South Africa in 1994 appears to have had a positive impact on the country's publication output, because from then on it increased, clearly indicating that it had surpassed East Africa's output. Stemming from the above, the researcher predicts that the publication output will probably continue rising and falling depending on the political situation that prevails in the two regions.

Figure 4: Trend publication by region
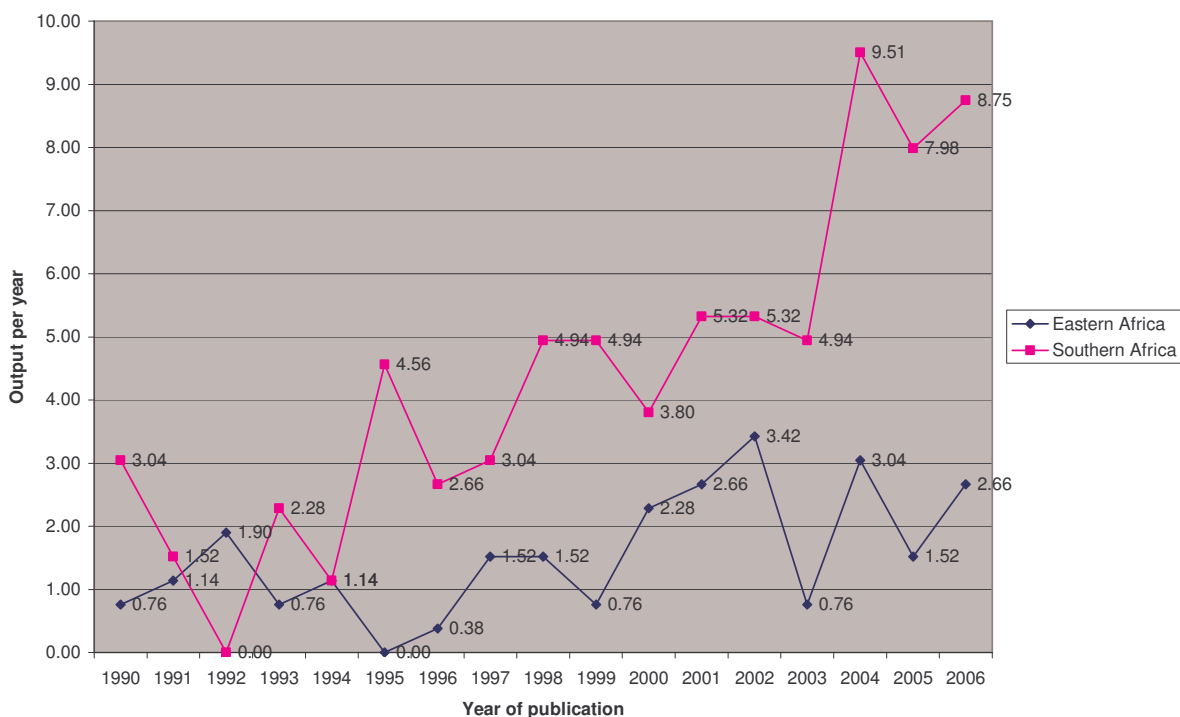
4.8 Most researched subject

196

This section was meant to identify the subject areas that academic librarians covered most in their publications. The results are illustrated in Table 4. In Eastern Africa, a total of 43 subjects were discussed in 69 publications. The most researched subject was Information Technology, which appeared in 9 (4.64%) publications, followed by Academic Libraries and Congresses, both of which were discussed in 5 (2.58%) publications.

In Southern Africa, a total of 108 subjects were discussed in 194 publications. Bibliography and Library Automation were the most covered subjects, each with a total of 13 (6.70%) publications, followed by Academic Libraries and Congresses with 12 (6.19%) publications each. Book Reviews were in third place with 9 (4.64%) publications.

Academic librarians from both regions were interested in Library Automation, possibly because the period from 1990 to 2006 saw more libraries moving away from manual to automated library systems. In both regions, academic librarians probably published articles on Academic Libraries because they were more familiar with the academic library environment. The results also perhaps illustrate that during this period, more conferences were held in Southern Africa than in Eastern Africa.

197

Table: 4 Distribution of publications by subject
N = 263

Eastern Africa region				Southern Africa region			
WORLDCAT and LISTA Database				WORLDCAT and LISTA Database			
No.	Subject	Fq 29	%	No.	Subject	Fq	%
1	Information Technology	9	4.64%	1	Bibliography	13	6.70%
2	Academic libraries	5	2.58%	2	Libraries and automation	13	6.70%
3	Congresses	5	2.58%	3	Academic libraries	12	6.19%
4	Information resource management	3	1.55%	4	Congresses	12	6.19%
5	Information Services	3	1.55%	5	Book reviews	9	4.64%
6	Human resource library	2	1.03%	6	Libraries	4	2.06%
7	Health information	2	1.03%	7	Internet	3	1.55%
8	Cataloguing	2	1.03%	8	Law libraries	3	1.55%
9	Bibliography	2	1.03%	9	Web portal	3	1.55%
10	Agricultural information network	2	1.03%	10	Electronic journals	3	1.55%
11	Document Delivery	1	0.52%	11	Libraries mergers	3	1.55%
12	Electronic data processing	1	0.52%	12	OPAC	3	1.55%
13	HIV infection	1	0.52%	13	User education	2	1.03%
14	Fish information	1	0.52%	14	Library services	2	1.03%
15	Library building	1	0.52%	15	Information literacy	2	1.03%
16	Marketing	1	0.52%	16	Library consortia	2	1.03%
17	Library finance	1	0.52%	17	Library employee	2	1.03%
18	Internet	1	0.52%	18	Curriculum	2	1.03%
19	Agricultural literature	1	0.52%	19	African published journal	2	1.03%
20	Internet reference service	1	0.52%	20	Knowledge management	2	1.03%
21	Digital libraries	1	0.52%	21	Information accessibility	2	1.03%
22	Collection development	1	0.52%	22	Namibia – Imprint - periodical	2	1.03%
23	Telecommunication law & legislation	1	0.52%	23	Public libraries – South Africa	2	1.03%
24	Electronic resource	1	0.52%	24	Strategic planning	2	1.03%
25	Information dissemination	1	0.52%	25	Cataloguing	2	1.03%
26	Information profession	1	0.52%	26	Library orientation	2	1.03%
27	Library science	1	0.52%	27	HIV/AIDs	2	1.03%
28	Information specialist	1	0.52%	28	Libraries for teaching	1	0.52%
29	Agricultural libraries	1	0.52%	29	CD - MARC	1	0.52%

[29] Fq stands for frequency

30	Comparative librarianship	1	0.52%	30	Information science and teaching	1	0.52%
31	Library research	1	0.52%	31	Serial control system automation	1	0.52%
32	Library orientation	1	0.52%	32	Information retrieval	1	0.52%
33	Collection development	1	0.52%	33	Library science	1	0.52%
34	Library management	1	0.52%	34	Technologies and innovation	1	0.52%
35	Automated classification	1	0.52%	35	Electronic works	1	0.52%
36	Libraries and education graduates	1	0.52%	36	Information access	1	0.52%
37	ICTS	1	0.52%	37	Libraries – special collection	1	0.52%
38	Information seeking behavior	1	0.52%	38	IT - Cataloguing	1	0.52%
39	Electronic Information service	1	0.52%	39	Human rights	1	0.52%
40	Agricultural information	1	0.52%	40	Information science	1	0.52%
41	Rural development	1	0.52%	41	obituary	1	0.52%
42	Reserve collection	1	0.52%	42	CD – ROM - Africa	1	0.52%
43	Agricultural information services	1	0.52%	43	Fish information	1	0.52%
	TOTAL	**69**	**100%**	44	Community library	1	0.52%
				45	Library directory	1	0.52%
				46	Intranet and Internet	1	0.52%
				47	Indexing and abstracting	1	0.52%
				48	Information for rural	1	0.52%
				49	Library cooperation	1	0.52%
				50	Theses register	1	0.52%
				51	Archives	1	0.52%
				52	Visual learning	1	0.52%
				53	Library administration	1	0.52%
				54	Library collection	1	0.52%
				55	Legal information	1	0.52%
				56	Acquisition	1	0.52%
				57	Library partnership	1	0.52%
				58	Kipling Rudyard	1	0.52%
				59	E - Mail	1	0.52%
				60	Information storage and retrieval systems - agriculture	1	0.52%
				61	Agriculture	1	0.52%
				62	Descriptive cataloguing	1	0.52%
				63	CD - ROM	1	0.52%
				64	Government publications	1	0.52%
				65	Business information	1	0.52%
				66	Telematic libraries	1	0.52%
				67	Information service	1	0.52%
				68	Strategic management	1	0.52%
				69	University libraries	1	0.52%

				70	Animal information	1	0.52%
				71	Video copyright	1	0.52%
				72	NACO	1	0.52%
				73	Electronic resources	1	0.52%
				74	LIASA	1	0.52%
				75	Grey literature	1	0.52%
				76	AIDs	1	0.52%
				77	Union catalogue	1	0.52%
				78	Censorship	1	0.52%
				79	Swaziland National Bibliography	1	0.52%
				80	Library strategic planning	1	0.52%
				81	ETD	1	0.52%
				82	Copyright	1	0.52%
				83	Inter library loan	1	0.52%
				84	Evidenced based medicine	1	0.52%
				85	Libraries award	1	0.52%
				86	Association Institute	1	0.52%
				87	Freedom of information	1	0.52%
				88	Documentation	1	0.52%
				89	Translations(Rhetoric)	1	0.52%
				90	Legal literature	1	0.52%
				91	Intellectual property	1	0.52%
				92	Records management	1	0.52%
				93	Education technology	1	0.52%
				94	GAELIC region	1	0.52%
				95	Communication	1	0.52%
				96	National libraries	1	0.52%
				97	Libraries and education	1	0.52%
				98	Library science societies	1	0.52%
				99	Information specialist	1	0.52%
				100	Internet education	1	0.52%
				101	Education	1	0.52%
				102	Information science – rural women	1	0.52%
				103	Libraries - circulation	1	0.52%
				104	Data structure	1	0.52%
				105	Information technology	1	0.52%
				106	Academic librarian	1	0.52%
				107	Information structure	1	0.52%
				108	Information storage and retrieval	1	0.52%
					TOTAL	**194**	**100%**

4.9.   Nature of collaboration among academic librarians

200

In Eastern Africa, most (40; 15.21%) of the publications were single authored. The same results were found in Southern African publications, where again most (125; 47.53%) of the publications were done by individuals (see Figure 5). Academic librarians in both regions probably published alone because of poor library networks and a lack of funding for authors who wished to collaborate.

Figure 5: Nature of collaboration among academic librarians
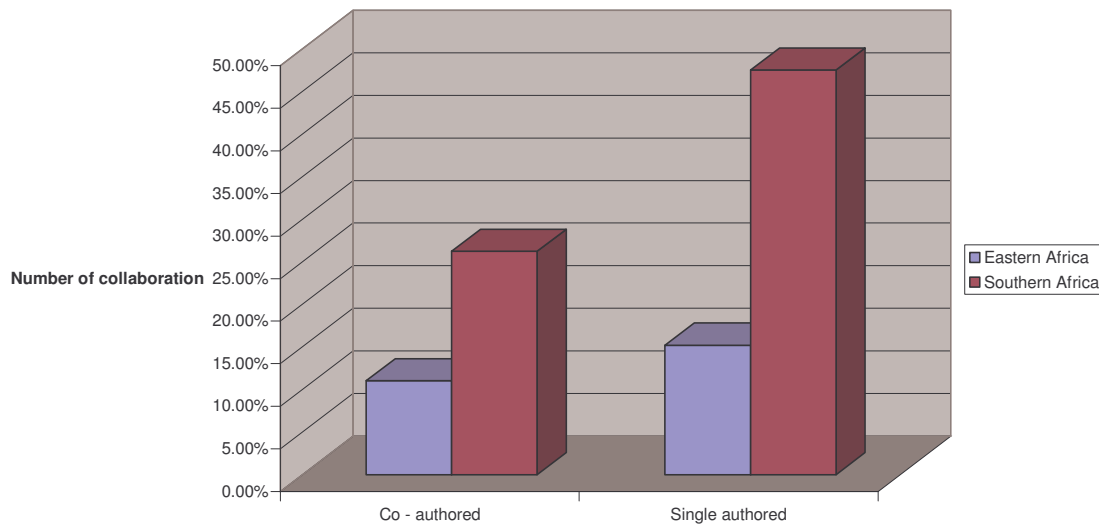
5. Conclusion and Recommendations

Based on the literature, it was noted that academic librarians publish mainly because of the recognition they receive, to add to the body of knowledge that goes into creating professional literature, for ratings, and for promotion. It was generally observed that academic librarians need to diversify the subject areas they research beyond the areas identified in the study. Other topics worth considering include user education and information literacy, research methods, indexing and abstracting, and information services. Academic librarians from both regions preferred publishing individually and less through collaboration, which would facilitate knowledge sharing, lead to improvements in the quality of research, and support lobbying for funding. There were significant disparities in the publication output of libraries, countries and regions. The libraries from the following

public universities urgently need to improve their productivity, seeing as they had no publications: Somalia National University, Kenya's Kenyatta University, Tanzania's Mzumbe University, the Open University of Tanzania, University of Khartoum, Zimbabwe's Midlands University; and the following universities in South Africa: University of Venda, Mangusuthu Technikon, Central University of the Free State, Nelson Mandela Metropolitan University, and the University of the Western Cape. Although it was noted that Southern Africa performed fairly well in terms of production, there is an urgent need for the following countries within this region to improve their research productivity: Zambia, Zimbabwe, Namibia, Swaziland, Ethiopia, Lesotho and Botswana. Likewise in Eastern Africa, these countries need to work hard to improve: Tanzania, Kenya, Uganda, Sudan, Ethiopia and Somalia. All academic librarians from both regions should be encouraged to publish regularly by making research and publication a criterion for the promotion of professional library staff. This should be strengthened by the provision of incentives such as consistent funding and sabbatical leave.

The study recommends similar research in other regions where studies of this nature have not been done in order to establish, among other things, why many academic librarians do not publish, problems faced by academic librarians who publish, and what can be done to make it possible for them to publish. Further research is also recommended on countries such as Angola, Burundi, Rwanda and Mozambique; and universities in the two studied regions that did not provide essential data such as the names of their academic librarians.

References

Aina, L.O(ed).2002.*Research in information science: an African perspective.* Ibadan: Stirling-Horden.

Africa News Update. 2005*. Kenya leading in brain drain.* Retrieved on June 8, 2008, from http://www.afrika.no/Detailed/11015.html

Aceto, L.2005.*The importance of research for a modern university.* Retrieved on June 8, 2008 from http://www.icetcs.ru.is/luca/slides/importance-of-research.pdf

Bahr, A. H. and Zemon, M. 2000. *Collaborative Authorship in the Journal Literature: perspectives for Academic Librarians who wish to publish.* Retrieved on October 2, 2006 from http://www.ala.org/ala/acr/acrlpubs/acr/journal/backissue2000bSeptember2/bahr.pdf

Career focus. 2006. *Career review part 3: the importance of research.* Retrieved on June 8, 2008 from http://www.nwpgmd.nhs.uk/Careers/Documents/Career%20review%20part3.pdf

Curran, S.1990. *How to write a book and get it published: a complete guide to the publishing maze,* Thorsons: Harper Collins

DEST HERDC *Specification for the collection of 2006 data.* n.d. Retrieved on July 27, 2007, from http://www.research.qut.edu.au/data/pubcollections/dest/nw-definition of .php

Goddard, W. and Melville S. 2001. *Research methodology: an introduction,* 2nd ed.Lansdowne: Juta

Gregory, G. M. and Medford. N. J. (eds). 2006. *The successful academic librarian: winning strategies from library leaders.* Retrieved on July 27, 2007 from http://www.ala.org/ala/acrlpubs/crljournal/backissues2006a/maycrl/gregoryreview.cf m

Hart, R. L. 1996. *Scholarly Publication by University Librarians: a study of Penn State.* Retrieved on October 2, 2006 from http://www.ala.org/a/ala/acrl/acr/pubs/cr/journal/backissues1996/September99/hart.p df#s

Majorie, F. 2000.*"Publish or perish! What's a librarian to do?"* Retrieved June 8, 2008 from http://www.dowling.edu/library/papers/marje/DASLOGPublishPerishArt.doc

Neuman, W.L. 2006. *Social research methods: qualitative and quantitative approaches*, 6rd ed. Boston: Allyn and Bacon

Poynter, D. 1979. *The self – publishing manual: how to write and sell your own book*, 5th ed. Santa Barbara, Calif: Para.

The Royal Society of New Zealand. n.d. Retrieved on July 27, 2007 from http://www.rsnz.org/publish/whypublish.phh

The Sowetan. 2008. Research is the key to success. *The Sowetan*: p. 20, February 21st

Stover, M. 1996. *The librarian as a publisher: a case study of a World Wide Web publishing project.* Retrieved on July 26, 2007 from http://www.library.ucsb.edu/untangle/stover.html

Thyer, B.A. 1994. *Successful publishing in scholarly journals*, London: Sage

Twining, J. 2001. *Bibliometrics: an overview*. Retrieved on June 8, 2008 from http://www.du.edu/~jtwining/LIS4326/bibliometrics.htm

Verzosa, F.A. 2007. Research *in librarianship: challenges, competencies, and strategies.* Retrieved on June 8, 2008 from http://eprints.rclis.org/archive/00012918/01/Research_in_Librarianship_keynote_spee ch.pdf

Yatiz, N. and Zainab, A.N. 2007. *Publication productivity of Malaysian authors and institutions in Library and Information Science.* Retrieved on June 8, 2008 from http://www.majlis.fsktm.um.edu.my/downlog.asp?AID=565