UNIVERSITY OF ZULULAND

Proceedings of DLIS 8th Annual Conference

Theme
"RESEARCH DEVELOPMENT AND PUBLICATIONS IN LIS IN THE NEW MILLENIUM"

Editors
Dennis N. Ocholla and Daisy Jacobs

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2007

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Eigth DLIS Conference 2007: Foreword   and Opening Remarks

It is my pleasure to welcome the Key note Speaker, Prof. Stephen Mutula, Guest Speaker and Assistant vice Rector of Research and Extensions, Prof. Myrtle Hooper, Guest Speaker, Prof. Jayarani Raju, and all honoured guests (DUT and UNISA), colleagues and students; to the 8th DLIS Conference, which is already a tradition in the Department. Knowledge sharing is increasingly recognized as the backbone of knowledge management and development in organizations, government and universities. There is no doubt, therefore, that the main reason we are gathered here is to share knowledge. Thus, we are here to showcase our research work and achievements, familiarize ourselves with what our colleagues are doing, learn from the papers presented, and interact and develop new research linkages and networks. The purpose of this conference is to promote knowledge sharing through constructive discourse amongst staff and students, and popularize LIS research and publication.

Research is given special attention in the Department. In our qualification programmes, research is offered in two modules during the final year of BLIS, BIS and PGDLIS qualifications. The first module provides a conceptual orientation of research, culminating in the development of a research proposal in an information related field. The second module requires research on the themes selected at the end of module one and a subsequent research project report.

Our annual conferences have been drawing papers largely from the leading research reports (with over 65% score) produced by our students. We are proud to note that some of the research papers have received recognition nationally. For example, in the year 2000, eight of our students were invited to present papers at the LIASA conference in Durban. In 2001, seven students presented papers at the LIASA conference in Johannesburg's Caesars Conference Centre. In 2002, eight students presented papers at the LIASA conference in Port Elizabeth, while another seven presented papers at the PROLISSA conference in Pretoria (see http://www.dissanet.com). 2003 saw five of our student's present papers at the LIASA conference in Rustenburg. Two received first (Mabel Majanja) and third (Veli Jiyane) prizes in the Student Interest Group (SIG) section for best papers and presentations. During September in 2004, seven LIS students delivered papers at the 7th LIASA Conference in Polokwane (see: http://www.liasa.org.za), and in October 3 staff members and 2 students delivered papers at the Prolissa Conference in Pretoria (visit: http://www.dissanet.com). In 2005, one staff member and two students presented research papers in Sweden–Stockholm (together with Bosire Onyancha), followed by a presentation in the USA-Kentucky (jointly with Joseph Kiplanga't) and South Africa-Cape Town (with Blessing Mbatha) among others. Last year (2006), staff and students presented 37 papers at local (16), national (20), and international (2) conferences. More importantly, six of our students presented papers at the LIASA conference in Pretoria in South Africa. At this conference, one of our students (Sipho Ndwandwe) received second prize for the best paper. Thus far, 2007 has seen staff and students deliver 25 papers, including 10 International (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). We believe that our invitation to participate in these conferences reflects on the quality of research work done in the department.

Research presentations are not the only thing we do, as we also publish our papers in peer-refereed journals. Since 2002, the Department has consistently published an average of 5 peer refereed SAPSE articles per year. It is with pride that I inform you that one of our PhD students (Dr. Bosire Onyancha) who graduated with a doctorate degree in May 2007 has already published 9 SAPSE accredited research articles - two each in 2005, 2006 and 2007.

The effort of staff, the graduate students and their supervisors, saw us publish 8 articles in SAPSE accredited journals in 2005, and 6 in 2006. In three consecutive years, our department has emerged as one of the three top (leading in 2005) departments (of 48) in the University in terms of the number of publications in Accredited Journals, and generated over R570 000 in 2005 and R510 000 in 2006 to the University through SAPSE subsidies. 2006 saw the department achieve the highest SAPSE subsidized publications output in the Faculty of Arts and the second highest in the whole University(while in 2007 we came first in the University in terms of research output through publications in peer refereed journal and was awarded certificate of recognition for research endeavor by the University). As I talk today, we have already produced 6 SAPSE AJ publications, of which five have already been submitted to the research office of the University. We are also building on our postgraduate students for research output (at the moment, we have registered five honours, seven masters and 9 PhD students).

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 conferences, research output and support for research initiatives. I expect that at the end of this conference, participants will be able to achieve one or more of the purposes of conferences some of which were outlined earlier

We undertake to continue with staff and student conferences in the future, encourage more participation from KZN and other student and staff research communities (as has been done to some extent this year), support the publication of good research papers in national and international AJ journals and websites, and encourage quality LIS research and publication. The proceedings of the 2003 and 2005 conferences may be accessed through 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.

On behalf of my colleagues and the organizers of this conference, whom I thank most sincerely, I wish to declare this conference open.

Thanks
Prof. Dennis Ocholla
5th October 2007

CONTENTS

Popularising Research at the University of Zululand

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As a teacher and researcher in English for nearly twenty years, I find I like to approach most topics from the starting point of definitions. The *Oxford English Dictionary* defines the word **research** as

n. & *v.* Careful search or inquiry *after* or *for* or *into*; endeavour to discover or collate old facts etc. by scientific study of a subject, course of critical investigation

I like this definition because it shows that research is not necessarily something big and intimidating, but rather something quite straightforward that is done by people for particular reasons or purposes.

The word **popularising** means

v.t. make popular; cause (person, principle, etc.) to be generally known or liked; present (technical subject etc.) in popular form.

Again the emphasis is on people, and the importance of research for people. Research should not produce results that sit on shelves: it should be read, used, applied, it should make a difference to people's lives.

Of course there are different types of research, and research can take different forms. The Organisation for Economic Co-operation and Development (OECD), in its Frascati Manual, distinguishes between the following "types" or "modes" of research:

- Basic research, which is experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations of phenomena and observable facts, without any particular application or use in view. The results of basic research are not generally sold but are usually published in scientific journals or circulated to interested colleagues (FM: 77)

- Strategic research, also known as oriented basic research, is research carried out with the expectation that it will produce a broad base of knowledge likely to form the background to the solution of recognised or expected current or future problems or possibilities (FM:78)

- Applied research, which is also original investigation in order to acquire new knowledge. It is, however, directed primarily towards a specific practical aim or objective. The results of applied research are intended primarily to be valid for a single or limited number of products, operations, methods or systems. The

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[1] Myrtle Hooper, PhD, is a Professor of English and Assistant Vice Rector Research and Community Outreach at the University of Zululand, South Africa. She was the Guest Speaker at the Conference.

knowledge or information derived from applied research is often patented but may also be kept secret (FM:78)

- Experimental development, which is systematic work, drawing on existing knowledge gained from research and practical experience that is directed to producing new materials, products and devices, to installing new processes, systems and services, and to improving substantially those already produced or installed. This category has little or no meaning for the humanities (FM:79)

As the Higher Education Quality Committee have pointed out, though, "in countries like South Africa, research often has a specific focus on understanding social change, and has collective and individual development as a fundamental objective" (2005:10).

In addressing this topic, the first question I would pose is, why should research be popularised? And the first answer, I suggest, is its value for scholarship. One of the important current issues in higher education is that of quality, and one of the ways in which quality can be promoted is by ensuring that research is made accessible to comment and critique; that research can accommodate feedback from those who receive it. In this way its quality can be tested and improved. The second answer is its value for those who receive it, either in the sense of impact on current knowledge, or in the sense of communal benefit. The third answer is the moral imperative. The state funds higher education and part of its reason for doing so is as an investment in knowledge, for which it expects returns. It thus becomes incumbent upon academics to repay this investment by ensuring that research emanates in tangible outputs that it doesn't just sit on shelves gathering dust. And the last answer is a negative one: that there are costs involved in not doing so. Gathering dust is a waste in more ways than not providing a return on investment: when discoveries don't reach those they should benefit, opportunities and potential developments are lost.

My second question is who should popularise research? National surveys conducted by the Centre for Research on Science and Technology (CREST) and the National Research Foundation (NRF) of South Africa, amongst others, reveal depressing trends. Most researchers, still, are what might be termed 'great white males', and they are a dying breed – because as this productive generation of researchers ages, they are not replicating themselves, and so the national base of research knowledge and skills is being eroded. On the other hand, this predominant perspective is limited, by race, by gender, by cultural positioning. The Status Report I compiled in 2004 on research at our institution showed similarities to the national trends, with the most productive researchers being mostly male, mostly white. And so the concomitant question is, who will do research in time to come? The broad imperatives are twofold: to pass on knowledge and skills as a heritage that can outlive the present generation, and to broaden the base, so as to engender greater levels of participation by a diverse population of researchers.

My next question, then, is how? Perhaps I must beg forgiveness, at this point, for answering in terms of myself, because at the University of Zululand it has become my job to do something about this. In the first instance, I think one has to use a combined strategy of rewards, penalties and support.

Fortunately national policy is demanding that academics become more research active and more research productive. The new funding framework provides for both input funding, that is the funding needed to do research, and output funding, that is financial recognition for research publications and successful graduations of masters and doctoral students. At UZ we have undertaken a comprehensive campaign to spell out expectations: that all staff should be involved in research; that all staff should account for their research activity and productivity every year; and that research should be a key element in new appointments and in

promotions. The carrot side of things involves rewards and incentives, and we have good ones at UZ – have had for a long time. Staff who completes higher degrees gets a notch increase as well as a substantial once-off payment; staff who publishes get access to individual and departmental portions of funds generated by publications; and staff who wishes to give papers at international conference receive 60% of costs to do so, provided they meet certain criteria.

As well as sticks and carrots, there are sources of support for research on this campus. In the first instance heads of departments are responsible for research within their departments, and for inducting and mentoring junior colleagues and novice researchers as well as senior students. All faculties have representatives on the research committee, whose role includes fostering and promoting research, assisting with proposals and applications, and channelling information to and from the committee. All staff who undertake research can register their projects with the research committee and receive funding to do so – up to R50 000 per year. Workplace skills development includes a focus on research, and the Gender Equity Task Team does work especially with women researchers. Although conditions for doing research are often criticised, task teams, working groups and committees are reviewing and updating policies and procedures to try and address this. External funding announcements and opportunities are broadcast to staff, and some interested and committed applicants have been successful in taking these up. Recent innovations since 2005 have also involved providing – quite well, I think – for higher degree students, who may register their projects through their supervisors, and access funds to do research and to present their findings at conferences locally and internationally, provided certain conditions are met.

A more subtle, but perhaps more effective strategy for developing a research culture has been that of recognition. Relevant staff have been invited to working groups and forums so as to come together and discuss their work with others who are interested. Annual graduations bring publicity both to graduates and to their supervisors. Recognition functions have been held for successful researchers; and specific individuals have been nominated for external awards. More systematic has been the development and publication of a research newsletter which we try to bring out every three months. This is a forum to which individuals and departments are invited to contribute brief reports on their research (and community outreach) activities. This has become a very functional medium, as evidenced by the increasing number of contributions, many of which are sent in voluntarily. People like to see their work featured through this little press. A copy of the newsletter is also hosted on the University's website, and there are plans to make it more electronically functional. Last, and most effective, is individual contact. The advice I got from my counterpart at UWC when I first took this job was, "gentle but firm eye contact; conversation in corridors"!! Much conversation between researchers and the research office happens by e-mail; and much contact happens face-to-face. It has been a concerted effort to get to know researchers from all disciplines and walks of campus life, but it has paid off, and many people now will stop me for corridor conversations to brief me on their latest efforts, tribulations and successes. Simply speaking, when people know their work is valued it matters to them. And that really is the acid test: to see if the motivation to do research can be shifted from external to internal, when research becomes intrinsically rewarding for those who do it, then it is self-sustaining and we have achieved an established culture of research.

But the most productive domain for research is not individual, it is departmental, and preferably interdepartmental and multidisciplinary, so that insights and inputs can feed into the work that we all do, the problems which we all face and we need to address together. Of the faculties on campus, I'd say Science and Agriculture has the strongest and best developed tradition of research activity, though certain persons in Arts have overtaken them in recent years in terms of output. I have personally benefited by this: my first mentors when I started

out as a researcher were in Science, even though they were members of the 'great white male' genus. The new executive deans have a responsibility to lead, but all departments have a responsibility to plan and to monitor research, so that long-term development can take place.

And in this light, I'd like to commend the Department of Library and Information Science, and consider it, and especially its head of department, as role models, and instances of good practice. Professor Ocholla is a researcher of national and international standing; he attends conferences; he publishes; he serves on executives and boards of professional associations; he edits a disciplinary based journal; he attracts external funding. He has achieved an NRF rating. But his attentions are not only directed outside the institution: he participates in a multi-disciplinary research team, here, and contributes to research development in the broader sphere of the University; within his department he has attended to the development of his staff, and built up a strong cohort of postgraduate students who are receiving a good grounding in research and who, on completing their formal dissertations and theses, are expected to publish their research findings in the public domain. This conference itself is part of that process of development: giving students an opportunity to present their work in a sympathetic environment before going on to participate in national and even international level meetings. He is producing autonomously motivated, independent researchers, who will go on to make an impact in the real world. He has reached that enviable status of the scholar who walks down the street and is greeted by past students with a, "Hi Prof", because he has inspired their enduring respect.

And in doing so, he has played his part in the cycle of development. We hope his students will remain active alumni of the University and of the Department, who will be ready to feed back into its academic and research activities as guests, visitors and associates, and so enrich the quality of education that is offered and received within it. I think this places an obligation on students, too, to recognise what they have been given, and to show their appreciation in active and responsive ways.

As I said to start with, my disciplinary home is English, and I must admit that when I was invited to speak at this conference, I had some moments of hesitation. I was put off by all those "metrics": "informetrics", "bibliometrics", "webometrics", "scientometrics" – jargon I did not take to! But the underlying concept is that of measurement, isn't it? And if 'metric' means 'measure', then I suggest to you that this Department stands as a measure of success: because in its activities, in this conference it is hosting today, research has indeed been popularised!

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See also http://www.research.uzulu.ac.za or through http://www.uzulu.ac.za

Local Content Model for Popularizing Research in LIS

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Abstract

The LIS academic and research environment is increasingly faced with a number of significant challenges and opportunities that are of a professional, political, social, economic and technological nature. One of these challenges relates to the provision of academic/research programmes that meet market demands, are in keeping with national development priorities, and conform to international standards and practices. Multiple paradigm shifts in the global information environment, which include but are not limited to MDGs; governance issues; public sector reforms; the emerging information society; the digital divide; web 2.0 technologies; e-readiness issues; and the changing role of libraries; provide LIS with opportunities to offer academic/research programmes that are relevant to the scholarly world, government, industry, civil society and the general community. In order for research to be appreciated and applied, it should reflect both national aspirations and development priorities, and global trends. This paper proposes a local content model that can be used to promote and popularize research in LIS in the 21ˢᵗ century.

Keywords: MDGs, Local content, Digital divide, E-readiness, LIS research, Web 2.0 technologies

Introduction

Scholars in all disciplines the world over are constantly challenged to make their scholarly work known, critiqued, and peer reviewed by colleagues situated in international academia. Likewise governments, industry, civil society, and the global community, are increasingly putting pressure on universities to demonstrate accountability for the taxpayers money used to fund their operations. The mounting pressure on universities is understandable, given the fact that universities the world over are recognised as important institutions in society with regard to research, knowledge generation, scholarship and innovation. The research role of universities among other things includes, advancing basic knowledge and scholarship in a recognized field; advancing technology; developing new or improved products; enhancing process or system performance; developing new uses or applications for existing products; designing and developing prototypes; and enabling the integration of systems.

Research, whether basic or applied, should therefore be driven by national priorities and international agendas, and must aim to improve the lives of people. Research agendas, especially of an applied nature, derive from the local context within which such research is undertaken. Consequently research outputs are, first and foremost, of local content nature. Numerous iterations and perfections of the research's concepts, products or services enable it to eventually find acceptance and application in regional and global environments.

Research Challenges for LIS in Africa

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[2] Stephen Mutula, PhD, is an Associate Professor in the Department of Library and Information Studies, University of Botswana, Botswana. He was the Key note Speaker at the Conference

A review of LIS abstracting and indexing services reveals a number of weaknesses in the scope and coverage of research in LIS. By and large, most traditional aspects of the profession still dominate, while new and emerging areas have hardly been addressed. For example, there appears to be an over emphasis on areas such as users studies, information seeking behaviour, library education, library automation, information retrieval, bibliometrics, librarianship, Internet and the WWW, and ICT use in libraries and information centres. On the other hand, under-researched topics include indigenous systems, local content development, e-publishing, e-records management, freedom of information, advocacy, research in LIS, information audits, mobile communications, digital libraries, information repositories, information inequality, digitisation, intellectual property rights, information needs of SMEs, infopreneurship, scholarly publishing and communications, e-readiness, knowledge management, and knowledge taxonomies (Wilson, 2007; Moahi, 2007). Further under-researched areas include information and development, information and governance, community informatics, social networking, open source and open access, information indices, the digital divide, media production, online communities, community information systems, and ICT education and training.

Moahi (2007), in a study of library and information science research in Botswana between 1980 and 2006, found that most research was of a descriptive nature and lacked the empirical rigor to make any impact on national development. She noted that the country has seen little cross-disciplinary research endeavors, and more often than not, no collaborations between practitioners and academics. Research in the region has also not been informed by a research agenda. This is despite the fact that increasingly, now than ever before, the complex global environment demands LIS academia to work with others across disciplines to address emerging priorities that cut across traditional disciplinary boundaries.

Makiko (2006), in a study of trends and issues of LIS education in Asia, noted that:, the word 'library' is being eliminated from the names of LIS programs in order to attract students; there is a shift in the educational level from undergraduate to graduate; changes are occurring in core subject areas, from an emphasis on manual-based collection development to ICT-based information/knowledge management; there is a depreciation of LIS education for school librarians; there are decreasing opportunities for new employment in library markets due to the over production of LIS graduates; there is a growing low interest amongst well-educated graduates in seeking employment opportunities in the public library market, which is perceived as offering relatively low social status and wage levels compared to national and academic libraries; there is a lack of understanding amongst employers with regard to accepting LIS graduates as capable knowledge workers; and finally, there is an increase in the number of faculties with doctoral degrees who prefer to teach cutting-edge courses rather than traditional library oriented courses.

Like other disciplines, LIS research outcomes are published in scholarly journals, indexing and abstracting services, catalogues, books, newsletters, and conference proceedings, etc. Whereas the publication of research output in refereed journals gives a higher visibility and reputation to the papers, author, and institution, when compared to those published in non refereed journals, it denies other users who do not have ready access to such publications. This is exacerbated by the fact that traditional models of journal publishing are costly. Moreover, the process of manuscript submission, peer review and editorial work is cumbersome and time consuming.

Research Challenges in Africa

Several challenges hamper universities, particularly those in Africa and other parts of the developing world, in terms of carrying out and popularizing their research outputs. In South Africa, decreasing state subsidies (Botha and Simelane, 2007) are raising great concern amongst universities. Moreover, there is a growing concern about the low success and throughput of graduates and research. Research is either not published or is not digitized, making it largely inaccessible. Often, the research process is disconnected from the development priorities of the nations.

Africa and the developing world generally suffer from a shortage of research expertise. Some researchers are often not sufficiently equipped to carry out or supervise research. In a number of universities, it is not uncommon to find staff members who are not appropriately qualified supervising either PhD or Masters Students. In South Africa, Biermann and Jordaan (2007) note that the status of research at the Tshwane University of Technology is poor because of the scarcity of research expertise, inexperienced supervisors, and supervisors working in fields that differ from their specialisations. This situation results in low research outputs, and generally discourages students who would wish to continue with their postgraduate studies.

Lor (1998) identifies the challenges facing LIS journals in developing countries. He points out that the "filtering out" of articles submitted by authors from less developed countries (LDCs) to journals in the developed world is common. Moreover, authors from LDCs tend to publish in more prestigious foreign journals which are less accessed by scholars from LDCs because of high subscription costs. Additionally, the speakers of languages that are widely used internationally are less likely to read articles in other languages because of their unfamiliarity with new terminology and conceptual frameworks. Lor notes that in South Africa, government insists that academic authors should publish their work in high-ranking journals for their affiliate institutions to obtain state subsidies, Such high ranking journals are by and large found in developed world and are also international in scope making publishing articles in them very competitive especially for scholars from developing world where there is less endowment of resources necessary for research and innovation.

Most universities in Africa face various obstacles, including the lack of adequate research funding, poorly developed publishing infrastructure, lack of enabling research policies and strategies - both at institutional and national levels, low level and sophistication of postgraduate programmes, lack of effective intellectual property mechanisms, high costs of both print and electronic journals, lack of incentives for researchers, inadequate mentoring frameworks, low quality of research products, inadequate research marketing strategies, lack of research intelligence gathering mechanisms, and weak or lack of partnerships with government, industry, public, donors, etc.

The first means of popularizing research products have, in the past, relied on print-bibliographic tools such as indexing and abstracting services, journal publications, conferences/seminars, and exhibitions. Moreover, the tools have tended to focus on the end products, and yet successful research is largely not about the end product but rather the entire process. The tools also tend to target the elite in society as opposed to the general public, who would probably find better and more practical use of the end products.

Though universities generate large amounts of local content in terms of research and publications, the research outcomes hardly find their way to international audiences. This, in part, can be attributed to the fact that most of the content is offline (Ballantyne, 2002).

Global Dynamics and Paradigm Shifts

The global information landscape has been transformed significantly in the last decade, occasioning several challenges and opportunities for the LIS discipline. The MDGs, WSIS, public sector reforms, digital divide, and globalization are some of the paradigm shifts sweeping through the LIS academic and research environment. These shifts provide opportunities for LIS to design academic programmes that are market driven and to enhance a diversified and rich research environment. However, they are putting increasing pressure on universities to invest in new and innovative technologies and methodologies in order to remain relevant.

Millennium Development Goals: *Governments the world over are now preoccupied with how to meet the Millennium Development Goals (MDGs) by the year 2015. T*he MDGs include: eradicating extreme poverty; achieving universal primary education, promoting gender equality, and empowering women; reducing the mortality rate of children; improving maternal health, combating HIV/AIDS, malaria, and other diseases; ensuring environmental sustainability; and developing a global partnership for development (*Department of Public Information, United Nations, 2005)*

Individual countries development priorities also define areas of national interest. The South African government web portal has a conspicuous statement of intent - 'Batho Pele' (literally translates as 'people first') - giving the indication that the focus is on and about people/citizens (GCIS, 2007). The details of national development priorities are articulated in vision 2014, a template for the government's efforts to meet its development agenda within the framework of the developmental state. They include, for example, knowledge sharing – facilitating dialogue and the sharing of experience within and outside of South Africa (Department of Trade and Industry, 2006). Similarly in Botswana, the development priorities of the nation are addressed in national development plans as well as in the vision 2016 strategy.

The attainment of MDGs is a journey that demands collaboration between various stakeholders, including government, academia, civil society, the private sector and the general community. Academia and the research community are looked upon to come up with innovative models that would help in the design of various interventions towards achieving MDGs.

During the preparation of the World Summit on Information Society (WSIS) a great deal of time and resources were leveraged over a four year period (2001-2005) to bring together governments, civil society, academia, and the private sector to provide a framework for international debate aimed at creating an all inclusive information society (Souter, 2007). *One of the key catalysts in the attainment of MDGs is the inclusive access to, and effective use of, ICTs by the entire populace of every country on the globe. That* ICT is critical in the implementation of MDGs is reflected in the fact that out of the 48 indicators used to benchmark progress towards MDGs, the last three read thus: 1) to increase the percentage of the population with access to telephone lines and cellular subscribers; 2) to increase the number of personal computers; and 3) to increase the number of Internet users. Moreover, the UN General Assembly Resolution 56/183) of December the 21st. 2001, recognises the need to harness the potential of knowledge and technology for promoting MDGs. The UN Millennium Declaration (8 September 2000) contains a commitment aimed at ensuring that the benefits of new technologies, especially information and communication technologies, are available to all (ITU, 2005).

The main outcome of the first WSIS held in Geneva, Switzerland, in 2003 was the declaration of principles and the plan of action. The declaration of principles stated in part that "*information in the public domain should be easily accessible to support the information*

society, and be protected from misappropriation. Public institutions such as libraries and archives, museums, cultural collections and other community-based access points should be strengthened so as to promote the preservation of documentary records and free and equitable access to information" (World Summit of Information Society, 2003; Berry, 2006).

The plan of action incorporated a good portion of what IFLA had sought, including: connecting villages and establishing community access points; connecting universities, colleges, secondary schools and primary schools; creating scientific and research centers; and providing public libraries, cultural centers, museums, post offices and archives with ICT. The connectivity the IFLA sought was to pay special attention to rural and underserved areas, while respecting intellectual property rights (IPRs) and encouraging the use of information and sharing of knowledge (World Summit on Information Society; Berry 2006; International Federation of Library Associations and Institutions, 2005; International Federation of Library Associations and Institutions, 2006).

From the second phase of WSIS, IFLA generated a manifesto on libraries which outlined the role of the library in the inclusive information society, such as enhancing intellectual freedom by providing access to information; helping to safeguard democratic values and universal civil rights; opposing any form of censorship; and building capacity by promoting information literacy and providing support and training for the effective use of information resources (World Summit on Information Society, 2005; Berry, 2006). IFLA underlined the following information readiness issues: universal and free access; and the use of traditional media and new technologies and records management; as necessary preconditions for good governance (Berry, 2006).

Within Africa, the African Information Society Initiative (AISI) seeks to build Africa's information highway, which would utilise information and communication technologies to accelerate the socio-economic development of Africa and its people (Amoako, 1996). Similarly, the New Partnership for Africa's Development (NEPAD) has a broad-based ICT institutional framework whose desire it is to initiate the implementation of ICT projects that aim to encourage decentralised collaboration within Africa and between Africa and the rest of the world. NEPAD, in partnership with the private sector, has embarked on an e-school project across the continent through collaboration with the respective ministries of education in member countries (Mikenga, 2005) to provide ICT in schools to improve the quality of education in Africa.

The Southern African Development Community (SADC) member states have established some institutional frameworks to enhance e-readiness and propel the region into an information society, and also enable countries of the region to play greater roles in the information age. The SADC member states are signatories to the SADC IT protocol that focuses on, among other things, developing an information society in Southern Africa; encouraging growth of software and hardware; improving human resource capacity; and increasing investment in information and communication technology infrastructure and services (SADC, 1999:27).

Community Informatics (CI): Community Informatics is the use of information and communication technology to facilitate access to information within communities (Bieber et al., 2002). Community informatics is directed at examining how and under what conditions ICT access can be made usable and useful to a range of users, including excluded populations, and particularly to support local economic development, social justice and political empowerment.

Through CI, rural and urban communities are expected to enhance their awareness of the potential of information and communication technologies to: enable access to information for development; facilitate access to local or regional market information for small producers; enable access to information about social and health services; provide a better way to gain access to information needed to respond to community problems; promote access to information about legal or policy issues; and provide access to information about jobs (Gurstein, 2000). The scope of Community Informatics cuts across many disciplines and brings together insights from fields such as library and information sciences, computer science, information technology, information systems, sociology, women's studies, management sciences, social work, anthropology, management, and communication sciences (Babier et al., 2002; Denison et al., 2003).

Benjamin (1999), in the context of post-apartheid South Africa, has shown how community-based ICT projects have failed due to the use of non-participatory approaches during implementation. Agada (1999) notes that people in economically and socially marginalized communities have been found to spend an inordinate amount of time and energy seeking and managing information related to survival and security. Recent work in the area of digital government in the US revealed how the lack of appropriate access points amongst communities hinders the provision of social services by forcing individuals, often the poor, to travel long distances between offices (Bouguettaya et al., 2001).

E readiness and Information Access: During the 1990s, governments the world over begun efforts to bridge the digital divide in order to obtain digital dividends for their citizens in the social, economic and political spheres. Among the digital dividends envisaged were and still are improved service delivery, prudent management of public resources, and overall good governance. Countries that are higher up in the digital hierarchy also perform better in terms of economic development. Switzerland, Finland, Sweden, Denmark, Singapore, the United States, Japan, Germany, the Netherlands and the United Kingdom are the world's top ten performing economies in part to the high level of digital connectedness of these countries (World Economic Forum, 2006).

The concept of e-readiness originated as a result of an attempt to provide a unified framework for the evaluation of the breadth and depth of the digital divide between the developed and developing countries. Several e-readiness models emerged, and they define the concept with respect to a community that has high-speed access in a competitive market; constant access and application of ICTs in schools, government offices, businesses, healthcare facilities and homes; user privacy and online security; and government policies which are favourable in terms of promoting connectedness and the use of the network (Bridges.org, 2001).

Countries strive to attain some measure of e-readiness for various reasons, such as: they aim to provide new and better responses to vital issues such as poverty reduction, wealth creation, and education, equity and social justice (Consulting and Audit Canada, 2004:1); understanding the e-readiness of a country or community is essential for providing baseline information that can be used for planning and also for making comparisons across regions, countries, and organizations; e-readiness assessments can be used as information gathering mechanisms to assist governments when planning strategies for ICT integration (SchoolNetwork Africa, 2003; Rizk, 2004); e-readiness assessment results can be leveraged to catalyze action, improve global competitiveness, and use limited resources wisely; and e-readiness assessment can help to map a country's regional and global position.

E-readiness assessments have generally investigated country-level preparedness across several sectors and largely adopted quantitative approaches that assign countries' numerical

scores depending on how well they have performed on specific components of e-readiness measures. To a limited extent, there are studies which have used qualitative approaches to assess the e-readiness scores of countries on connectivity, human capital, applications, sophistication of use, and geographical dispersion (Rizk, 2004).

Though several macro e-readiness assessment tools are available, the focus is largely on physical infrastructure, ICTs, policy and economic environment. Rizk (2004) points out that whereas macro e-readiness studies provide general insights into the countries' e-readiness status, they suffer a major draw back, namely that the choice of components and their relative weights could vary from one country to the next, and as such could be misleading.

e-Government: E-government is perceived as a panacea to the deficiencies of the traditional form of government where, for example, citizens physically go to government offices to seek services, such as applying for a passport, birth certificate, death certificate or filing tax returns (with the consequent delays arising out of long queues, lost files or the absence of relevant officials). E-government is largely an information intensive environment that consists of decision support systems such as records-management systems, integrated financial management systems, human resource management systems, communication systems, databases and portals. E-government is expected to improve the delivery of government services and information, enhance the efficiency and accountability of public administration, and strengthen economic performance (International Records Management Trust, 2004). Corporate e-government initiatives are increasingly being viewed within the context of a broader public sector reform agenda. Such initiatives are usually accompanied by thorough process-reengineering, organisational redesign and a skills development programme.

In an e-government environment, citizen/state interactions occur in electronic form. Consequently, citizens will expect that their rights are as well protected and documented in an electronic environment as in a paper-based one. It is therefore important to preserve the combination of content, context, and structure which give electronic records meaning over time to protect the fragile media from degradation, and to ensure efficient access.

New and Potential Areas for Research in LIS

The paradigm shifts in the global environment provide opportunities for LIS to design and offer innovative academic and research programmes. From the MDG framework, key research aspects may include, the information component of MDGs; nexus between information and development, information-based development models; information and reduction of poverty, dissemination of information on HIV/AIDS and malaria and other diseases; and information needs of small scale entrepreneurs, e-readiness for MDGs, role of library in democracy and governance, etc. Similarly, from the WSIS framework, LIS can harness academic and research areas such as information society metrics, dynamics of social inclusion and exclusion, impact of community tele-centres, open access, intellectual property rights; and freedom of access to information, information seeking behaviour of the rural folk, information literacy, etc.

Community Informatics provides an inter-disciplinary ground for LIS scholars to collaborate with counterparts in other disciplines. In addition, LIS has opportunities for research in areas such as information models to bring information to rural communities, information seeking amongst rural communities, community entrepreneurship, local content development models, and assessment of Internet connectivity models in rural communities, community radios, community portals, the rural-rural digital divide, and the rural-urban digital divide.

E-readiness and the digital divide provide a significant niche for LIS to develop market-oriented academic/research programmes. Areas begging for research in this area include, but are not limited to, developing micro e-readiness models, developing tools to cater for qualitative aspects of e-readiness, e-readiness models that take care of Africa's unique social economic and political context, and information-based e-readiness models. Similarly, e-government provides LIS with opportunities to design attractive academic/research programmes. Areas for research may include e-government models for developing local content; using knowledge management models for designing e-government content; citizen participation in e-government, e-government needs assessment; comparative studies of e-government models; e-records management in an e-government environment; application of records management to e-government systems; IP issues in e-government; and privacy and security in e-government.

Popularizing Research: Global Perspectives

There are various models at global and institutional level for popularizing research. The academic ranking of world universities considers variables that can be applied to popularize research. These variables include the quality of education, quality of faculty, level of research; visibility (using (webometric indicators), graduation rate performance, peer assessment; faculty resources, financial resources; research and publications, citations, staffing levels; and quality of university websites, etc (Sabatini, 2007).

The American Council of Learning Societies (ACLS), in 1965, began a program of providing fellowships to scholars whose projects experimented with computer aided research in the humanities (American Council of Learned Societies, 2006). This program was aimed at promoting research interest in the area of computer use within the humanities. Currently, ACLS is no longer concerned with the technological innovations that now suffuse academia, but rather with institutional innovations that are cumulative, collaborative and synergistic.

The US National Institute of Health (NIH) requires its funded researchers to deposit their final peer-reviewed manuscripts in its online digital archive. NIH also allows grant funds to be used to pay journal publication fees (Association of Research Libraries, 2006). The US Congress, on its part, has taken a growing interest in ensuring access to federally funded research. The Federal Research Public Access bill, introduced in May 2006, 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 endorsed the principle of open access moved to increase awareness among scholars and publishers of the need to make their publications available through open access so that they can be easily and widely accessed. In addition, it incorporated open access provisions in research support programs (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, the PubMed Central. It also provides grant recipients with additional funding to cover the publication fees charged by open access journals. Similarly, several research funding councils in Europe under the auspices of the European Union have implemented policies requiring grantees to deposit journal articles and conference proceedings in open online archives. The European Commission, in 2006, recommended the adoption of policies that guarantee public access to publicly-funded research shortly after publication (Association of Research Libraries, 2006).

The German Research Foundation (DFG) expects the research results it funds to be published and made available, where possible, digitally and on the Internet via open access

through discipline-specific or institutional open online archives following conventional publication in a recognized peer-reviewed open access journal (Association of Research Libraries, 2006). The Organization for Economic Cooperation and Development (OECD), along with the US, Canada, and 32 other nations, has pledged to work towards the establishment of access regimes for digital research data from public funding in keeping with the objective of openness (Association of Research Libraries, 2006) in order to facilitate wider access to research outputs

SADC Approach to Popularizing Research

In Southern Africa, the South African Development Community (SADC) member countries have agreed to co-ordinate their science policies and work together to develop the region's science and technology infrastructure. In particular, the countries - which include Zambia, Zimbabwe, Namibia and Botswana - will harmonize some of the rules governing how scientific research is carried out, especially customs regulations on the movement of researchers and scientific equipment. They have also agreed that higher education should be coordinated at regional level, and that the creation of regional training centres should be made a priority.

The University of Botswana has developed a research strategy to help drive and stimulate innovation. The research strategy outlines the areas that need to be focused on based on national priorities. The focus of the strategy includes the resource implications, the competencies needed, the monitoring process, the quality of the outcomes, the dissemination of outcomes (University of Botswana, 2006). The strategy also emphasizes the quality of research, adherence to ethical standards, and collaboration with government and industry. The research strategy explicitly defines guidelines for accountability and consistency, and provides for an inbuilt mechanism for commercialization of research products of the University of Botswana, incentives and rewards to encourage research among scholars at the University, multi-disciplinary, niche-based approach to research to enhance quality of research outcomes. Moreover, the strategy recognizes research capacity building, staff retention, a recruitment policy that emphasizes research skills, postgraduate programmes with student funding schemes, mentorship systems, creating a research culture, and improving research infrastructure (such as access to well equipped libraries, offices, classrooms; access to the Internet and electronic journals). The strategy further underlines the integration of research and teaching, the recruitment of quality staff to teach undergraduate programmes in order to encourage students to enroll for research programmes, institutional support, international student exchange and cooperation, and benchmarking against other well performing institutions (University of Botswana, 2006).

The University of Cape Town enhances its research visibility by, among other things, making it locally responsive and engaging. The University research strategy emphasizes global competitiveness of its research outcomes. The research capacity in the University is enhanced trough support for postgraduate studies, start up grants for new appointees, strategically selected research focus areas, support for departmental accredited journals, and the continuous review of its research strategy Research Office, 2007). On the other hand, the University of Pretoria emphasizes multi-disciplinary research to minimize duplication as well as identify niche areas (University of Pretoria, 2007).

Local Content and National Development

Local content, in its simplest form, refers to the proportion of goods and services generated locally within a given community or the country. Local content has become a topical issue amongst international political leaders and development agencies. The G8 Digital

Opportunities Task Force, in its 2001 Genoa Plan of Action, proposed the development of local content through making software applications available, encouraging the participation of local stakeholders, and expanding the language available on the Internet (DOT Force, 2001). On the other hand, UNESCO's actions in the cultural arena stress, among other things, working to increase the production and dissemination of local content in the media and via electronic networks (Sopova, 2003). Similarly, NEPAD's ICT arm, the e-Africa Commission aims to develop local content that would empower and propel Africans to make a unique contribution to the information society (Ford, 2001).

There are various compelling reasons why local content is increasingly finding a way onto development agencies' agendas. Africa faces the problem of the limited availability of information and knowledge systems that address African needs. Most consumption of information is external. Africa has the lowest proportion of global internet hosts compared to the Americas, Europe, and Asia (Soltane, 2002).

By and large, the technological used in Africa is imported, and such technology is often implanted rather than transferred because of a number of constraints, including the inadequate or complete lack of indigenous mechanisms to adapt to such technologies. Local content is crucial in bridging the digital divide in that it empowers people to link and communicate with the rest of the world by making a contribution to the global body of knowledge. Lack of access to local content of a people can in part be attributed to capital flight in terms of goods and services purchased from abroad. For example, in Nigeria, the National Committee on Local Content Development noted in a report that the local content of goods and services in the oil and gas sector is less than five percent, and about 95 percent of the yearly expenditure - about US$8 billion (N880 billion) - flows out of the country through technical services and goods procured from outside the country (Ugwuanyi, 2003).

Africa's local content, especially indigenous knowledge has for a long time been exploited by the developed world, especially in the area of environment and biodiversity, at the expense of local people (Ford, 2001). The importance of local content cannot be over emphasized as it draws on local resources and makes people less dependent on outside supplies, which may be costly, scarce and irregularly available.

Manifestations of Paucity of Local Content in Africa

There are various ways in which the paucity of local content affects the development of the African continent. The existing technologies used in Africa are largely imported and have not been engineered for poor infrastructure and inefficient electricity supply systems on the continent. Perhaps the use of battery powered computer systems would enable some parts of Africa without power supply access and use computers. In the absence of main electricity supply the technologies such as computers; Internet, etc cannot be effectively exploited. In addition, applications programmes deployed in Africa are often based on western models, including their types of problems and types of solutions. Consequently, these programmes do not always adapt well to the problems, cultural realities and sensibilities of Africa. Much of the technology is transplanted (merely dumped) rather than transferred where the local users can reengineer it to develop their own software and hardware industry.

The Internet provides a good medium for developing local content, but its penetration and use is low in Africa, as reflected in Table 1.

Table 1: Global Internet usage by region

World regions	Population (2007 est)	Population % of world	% Population penetration	Usage % of world
Africa	933,448,292	14.2 %	3.6 %	2.9 %
Asia	3,712,527,624	56.5 %	11.8 %	37.2 %
Europe	809,624,686	12.3 %	39.8 %	27.4%
Middle East	193,452,727	2.9 %	10.1 %	1.7 %
North America	334,538,018	5.1 %	69.5 %	19.8%
Latin America/Caribbean	556,606,627	8.5 %	19.8 %	9.4 %
Oceania / Australia	34,468,443	0.5 %	54.5 %	1.6 %
WORLD TOTAL	6,574,666,417	100.0 %	17.8 %	100.0 %

(Source: Internet World Statistics, 2007)

Two-thirds of the African bandwidth is reported to carry US- linked traffic. This pattern is not limited to Africa, in that 98% of the global Internet bandwidth is reportedly connected to and from North America, a condition that forces countries beyond that region to incur high costs (with payment in US or Canadian dollars), leading to cash flow in directions wholly counter to development (Gerhan and Mutula, 2005).

Ballantyne (2002) observes that the powers that 'push' global or non-local content are often much stronger than those 'pushing' local content. This can be seen in research, in the dissemination of 'reliable' scientific information, and even in the reliance on foreign technical assistance, television programming, in advertising, in the spread of global brands, in classrooms using imported curricula and examinations, and in the use of foreign languages in schools and universities. Moreover, most formal content and communication 'channels' in developing countries help to push 'external' content into local communities.

Internet governance is skewed in favour of the developed world, particularly the English speaking countries. This has been blamed as a factor contributing towards the global digital divide. The requirement that all domain names must be entered in ASCII characters in order to support the Latin alphabet means that diacritical marks, and Asian or other international characters, are not supported. Consequently, the exclusion of a number of other languages from domain names limits Internet access. Users who are not familiar with English have difficulties accessing English language URLs. Additionally, the lack of foreign-script support makes it difficult for indigenous businesses and entities to be represented on the Internet.

Moreover, English in computer-based communication is currently estimated to stand at 80 percent (Warschauer, 2002). In terms of languages that are not Roman alphabet based, the prevalence of ASCII (American Standard Code for Information Interchange) makes computing in other alphabets or character sets inconvenient or impossible. Within sub-Saharan Africa, a large proportion of indigenous people can neither read nor write in the English language and, as potential users of computers, have thus become increasingly marginalized.

Sopova (2003) points out that in a number of African countries, traditional ways of life, knowledge and know-how are disappearing with the onslaught of foreign cultural models. Furthermore, out of nearly 900,000 book titles published every year in the world, only 1.5% is published in Africa, against 73% in developed countries. The paucity of locally published materials and other local content output in Africa is manifested in indices such as e-

government readiness, digital opportunities, the information society, e-government maturity levels and e-readiness (World Internet Statistics, 2007; Economist Intelligence Unit) which largely show that Africa is far behind compared to other continents of the world. The paucity of locally produced published literature was echoed by Greyling (2007) who observed that libraries and information centres in Africa are poorly equipped to make a meaningful contribution to the global digital, knowledge economy.

Local Content Model for Popularizing Research in LIS

The global and regional initiatives that define national and international development priorities, espoused in such frameworks as MDGs, WSIS, AISI, and NEPAD, though international in scope, are largely geared to meeting development needs at local or national levels. Consequently, these frameworks can be applied to popularize research, especially if research can be perceived as a locally generated product.

Ballantyne (2002) observes that popularizing local content, of which research can be considered as part may be achieved through developing effective 'push' mechanisms; increasing and improving the supply of content; focusing on the demand side so that local content is more highly valued; and improving the packaging of content so that the content is more attractive and accessible. Moreover, since it is not possible to have all the necessary capacities to create and communicate content, partnerships are essential to overcome shortages in expertise.

Ballantyne (2002) points out that local content does not flow of its own accord, but it needs owners or originators with the motivation to create, adapt or exchange it. For local content to be useful, it requires people with skills to transform an idea into something that can be disseminated or exchanged. Mutula (2005), in a study of the e-readiness of the Botswana society, found that people were disappointed that though government often went and obtained information from them in attempts to implement innovative practices to improve their lives, they (the people) were not informed of the outcome of such surveys. They were therefore not enthusiastic about participating in government convened gatherings. The Office of Communications, Ofcom (2006), the UK telecom regulator, notes that local issues continue to matter to people and digital local content could, in this respect, deliver a range of benefits, including:

- more relevant local news;
- improved access to local services;
- stronger involvement in community affairs;
- enhanced democratic participation;
- greater capacity for individuals and local organisations to make and distribute their own content;
- support for local production and training; and
- Advertisers' access to local markets.

The local content model envisaged is one that has several interconnected pillars that work in a systemic manner. These are as follows: Research strategy; Technology and applications; Content Repositories; Intellectual Property rights; Research Broadcasting Mechanism; Metadata Standards; Stakeholders and Partnerships; Mentoring Systems; and Sustainable and Funding Coordination Mechanisms. The details about each of these pillars are described below:

- **Research strategy** is supported by the institutional framework; incentives to researchers (e.g. research funding, rewards for publications, time off to undertake research); partnership with industry; marketing and commercialization of research outputs; research intelligence gathering mechanisms; national and international priorities; scholarly communication channels (e.g. abstracting and indexing services, bibliographic services); and excellence and best practices.
- **Technology and Applications** pillar is made up of conventional and Web 2.0 technologies such as: Rich Site Summary (RSS), weblogs, social networking sites, wikis), e-learning, anti-plagiarism software and more.

- **Content Repositories pillar** consists of institutional repositories, digital libraries, databases, etc.

- **Intellectual Property Rights** pillar provides a framework enabling the creators of knowledge to be acknowledged and rewarded.

- **Research Broadcasting Mechanism** ensures that research outcomes are made timeously available through scholarly publications, such as the eGranary digital library-model, African Journals Online (AJOL), digital scholarship environments, electronic journals, mobile systems, community radios, newspapers (including local language newspapers), public forums, conferences and seminars, telecentres, etc.

- **Metadata Standards** provide an interoperable repository infrastructure with a single point of discovery and access and assists in the discovery and access of learning content from the diverse, extended collection of content repositories.

- **Stakeholders/Partnership** pillar assists with research problem formulation by identifying solutions, and participating in decision-making in the research process in order to help [direct the process], by providing ideas and by adding local and regional knowledge to the overall research process including the outcomes.

- **Mentoring Systems** are for building a sustainable research capacity for the university.

- **Sustainable and Funding Coordinating Mechanism** pillar is meant to ensure sustainable research funding

- **Monitoring Mechanism** was formulated to monitor the research process in order to ensure that the outcomes are relevant to national aspirations, are completed on time, and are good and of an acceptable quality.

- **Research, Community Needs and National Development Agenda Interface,** ensures that the research priorities and agendas of universities are aligned with the community's needs and the national development agenda.

Conclusion

The importance of making research and scholarly publications known and used far and wide can not be over emphasized. Dynamic changes in the global environment, fueled by the forces of globalization, are putting pressure on scholars to ensure that their scholarly output is made available and known not only to the scholarly community, but to anyone else who may wish to make use of such research. Making research known makes its sharing and application possible as a public good.

The conventional methods for publishing research and other scholarly work are slow, costly and often only accessible to only a few people in society. Given that research is meant to be beneficial to the public and is conceptualised within a given context (with the immediate local environment as its first beneficiary), a local content approach to publication is critical. The local content-based model advanced in this paper is a work in progress that will be refined to provide an alternative to existing means of scholarly publication and communication. Comments, critiques and suggestions on how the model may be improved are welcome.

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On Social Networks and '*Networking*': A Case Study of Author Co-Authorship Networks in HIV/AIDS Research in Eastern and Southern Africa, 1980-2005

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Abstract

Social networks play an important role in the analysis and tracking of relationships between the participating entities (i.e. words, individuals, institutions, and countries, etc). Social networks are likely to play an even greater role now and in the future than before due to the complex nature of un-resolved issues such as HIV/AIDS. The proliferation of local and international conferences has opened up new avenues for 'networking', a term that is increasingly becoming common, amongst researchers. This study examines collaboration networks amongst HIV/AIDS researchers in Eastern and Southern Africa, aiming to provide a better understanding of the nature and composition HIV/AIDS research networks; the changing patterns of the networks; and the geographic regions of study for each network. The paper ends by providing recommendations on some of the ways through which research collaboration and 'networking' in Africa can be promoted.

Keywords: Social networks, Social network analysis, HIV, Acquired Immunodeficiency Syndrome, Collaboration, Africa

1.   Introduction

In simple terms, social networks can be defined as structures consisting of nodes that are linked to each other by one or more specific types of relations (Wikipedia, 2007). The nodes in a social network can represent individuals, words, organizations or even countries, while the relationships between the actors would usually take the form of any of the following: values, visions, ideas, financial exchange, friendships, kinship, conflict, trade, web links, sexual relations, disease transmission, or airline routes, etc. Phillips & Phillips (1998:330) add that the "*relationships under scrutiny [in social networks] could include friendship, influence or in the case of a scientific discipline, patterns of communication or strength of association between members in a scientific community*". Network analysis, which Scott in Phillips & Phillips (1998:330) defines as "*a body of quantitative and qualitative measures which are used to better understand the relationships between and among members in a given social network*" is increasingly becoming one of the most commonly used techniques/approaches in the study of patterns that show up in scholarly communication. The technique has attracted scholars from virtually all disciplines including sociology, anthropology, sociolinguistics, geography, social psychology, communication studies, information science, organizational studies, economics, and biology.

A quick examination of two of the most recently published International Society for Scientometrics and Informetrics' (ISSI) conference proceedings (i.e. Ingwersen & Larsen, 2005; Torres-Salinas & Moed, 2007) shows a growing interest in mapping and/or visualizing research and scholarly communication using social network analysis within the subject

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domain of informetrics. For instance, the ISSI 2005 proceedings record a total of 17 articles that employed social networks to map research in various disciplines while the 2006 proceedings published a total of 28 such papers, a percentage increase of 40% over a period of two years. An analysis of these papers reveals that the technique has been largely applied to mapping and/or visualizing citation patterns (e.g. bibliographic coupling, co-citation analysis, etc), web-linking patterns (e.g. co-linking, government-university web-linking, link structures of web documents, etc.) and content analysis (e.g. word co-occurrence, relationships between and/or among keyword descriptors and/or documents, etc). Examples of the papers which fall into the aforementioned categories include Small (2001); Morris & Boyack (2001); and Janssens, Glenisson, Glanze, & De Moor, (2005); etc.

A research area that is increasingly using social network analysis is the study of research collaboration. Although the phrase 'research collaboration' has a "*very fuzzy or ill-defined border*" (Katz & Martin, 1997:8), it has been variously defined as "*partnership, alliance or network, aimed at a mutually beneficial clearly defined outcome*" (Commonwealth of Australia, 2004:1); a "*concept of two or more researchers (or researchers from two or more organizations or countries) working together*" (Diodato, 1994:47); and a "*system of research activities by several actors related in a functional way to attain a research goal corresponding with these actors' research goals or interests*" (Laudel, 2001:370). Thus, research collaboration, which is commonly measured by the co-authorship of the published literature in a given subject domain, can be conducted between and/or among individuals, institutions, and countries. The emergence of HIV/AIDS in the early 1980s provided a common area of research interest for many researchers, resulting in a flurry of research activities that involved both local and international researchers (Cohen, 2000a; 2000b). Both Cohen (2000a, 2000b) and Macias-Chapula & Mijangos-Nolasco (2002) observe that there is a high pattern of collaboration between individuals, institutions and countries in HIV/AIDS research in Africa. In their study entitled *bibliometric analysis of AIDS literature in Central Africa*, Macias-Chapula & Mijangos-Nolasco (2002) noted a very high pattern of collaboration through multiple-authorship of HIV/AIDS publications, accounting for 92.54% of the total number of publications.

2.   Purpose of the study

This study examines the HIV/AIDS literature published by and on Eastern and Southern Africa as indexed in the Thomson Scientific's Science Citation Index (SCI) and Social Sciences Citation Index (SSCI) in order to map networks of HIV/AIDS researchers in the two regions between 1980 and 2005. Specifically, the study uses the network analysis technique to:

1. Identify collaborating authors
2. Examine the growth and composition of author collaborative networks
3. Track changes in both the number and composition of author networks
4. Find out the main geographic areas of research focus in each author network
5. Identify potential collaborators for future research activities

3.   Methodology

The Thomson Scientific citation indexes (i.e. SCI and SSCI) were purposefully selected for data collection due to their provision of authors' addresses which was the main determining factor for the choice of databases. In addition to the provision of authors' names, the 'address field' provides information about the author's institutional affiliation and country. The following is an example of the information provided in the 'address field':

C1 Univ British Columbia, Ctr Dis Control, Vancouver, BC V5Z 1M9, Canada.
  Univ Washington, Dept Obstet & Gynecol, Seattle, WA 98195 USA.
  Univ Nairobi, Dept Med Microbiol, Nairobi, Kenya

Kenya Med Res Inst, Ctr Microbiol Res, Nairobi, Kenya.
Univ Manitoba, Dept Med Microbiol, Winnipeg, MB, Canada.

In order to extract HIV/AIDS records from the two citation indexes (i.e. SCI and SSCI) an advanced search strategy that combined the names of countries/geographic regions and HIV/AIDS descriptors was adopted. The searches were conducted within the Title, Abstract, Address and Keyword fields using TI, TS and AD field tags. The citation indexes permit a combination of searches using the Boolean operators, AND, OR and/or NOT. The 'search history' feature was used to conduct multiple searches, e.g. #1 AND #2, which instructed the database to search for documents that satisfy the requirements of both search #1 AND #2, where, for example:

- Search #1 took the form of *TI Angola OR TI Botswana OR TI Djibouti OR TI Eritrea OR TI Ethiopia OR TI Kenya OR TI Lesotho OR TI Malawi OR TI Mozambique OR TI Namibia OR TI Somalia OR TI South Africa OR TI Sudan OR TI Swaziland OR TI Tanzania OR TI Uganda OR TI Zambia OR TI Zimbabwe*
- Search #2 took the form of *TI HIV* OR TI Acquired Immunodeficiency syndrome TI Human Immunodeficiency syndrome,* etc.

And, where *TI* represents the Title field tag

The relevant records were selected and saved in a format that was compatible with CITESPACE[4] computer-aided software. The file names were in the format *downloadAngola2005.txt,* where the term '*download*' is the name given to the file so that the software can recognize it for purposes of data analysis; and *Angola2005* is a unique name given by us to the file containing records published by and on *Angola* in the year *2005*. Each file's data was then fed into CITESPACE for the production of author co-authorship (ACA) networks by selecting the option '*citing authors*' and appropriately setting other configurations that impacted on ACA analysis, e.g. citation, co-citation and co-citation co-efficient (i.e. c, cc, and ccv, respectively) thresholds and the type of network visualization, which in this case was the *cluster view*. The program's user interface is illustrated in Fig 1.

Figs 2 to 6 provide a time analysis of author collaboration from 1981 to 2005, split into six five-year periods. The 5-year time slice was chosen in order for the analysis to produce a reasonable number of networks which could be used to draw generalized conclusions as well as check for shifts in partnerships within a reasonably short time period. A summary of the network threshold settings is given under each Fig. Different citation thresholds were set for each time analysis in order to produce manageable networks. Slicing a time interval into smaller segments is meant to assist one to clearly understand how co-citation networks over individual time slices are patched together. We did not consider slicing the time further into smaller segments as necessary because the five-year period, with 1 year per slice, was manageable. Time slices were set as follows: 1981-1985; 1986-1990; 1991-1995; 1996-2000; and 2001-2005. The year 1980 was left out (i.e. pruned) as it did not yield any nodes nor links.

Fig 1: Citespace v. 7.0.1 (© 2003-2005) user interface (developed by Chaomei Chen)

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[4] CITESPACE is a java program for co-citation analysis, specifically for visualizing co-citation networks. Currently, it takes citation data in Thomson Scientific Export format and generates node-and-link drawings of co-citation networks. The program uses the following information of a bibliographic record to generate maps: (a) authors; (b) title, descriptors, identifiers, and abstract; (c) cited references; (d) times cited; and (e) year of publication. The co-citation networks that the program generates include author co-authorship networks created by analyzing the citing authors, among others.
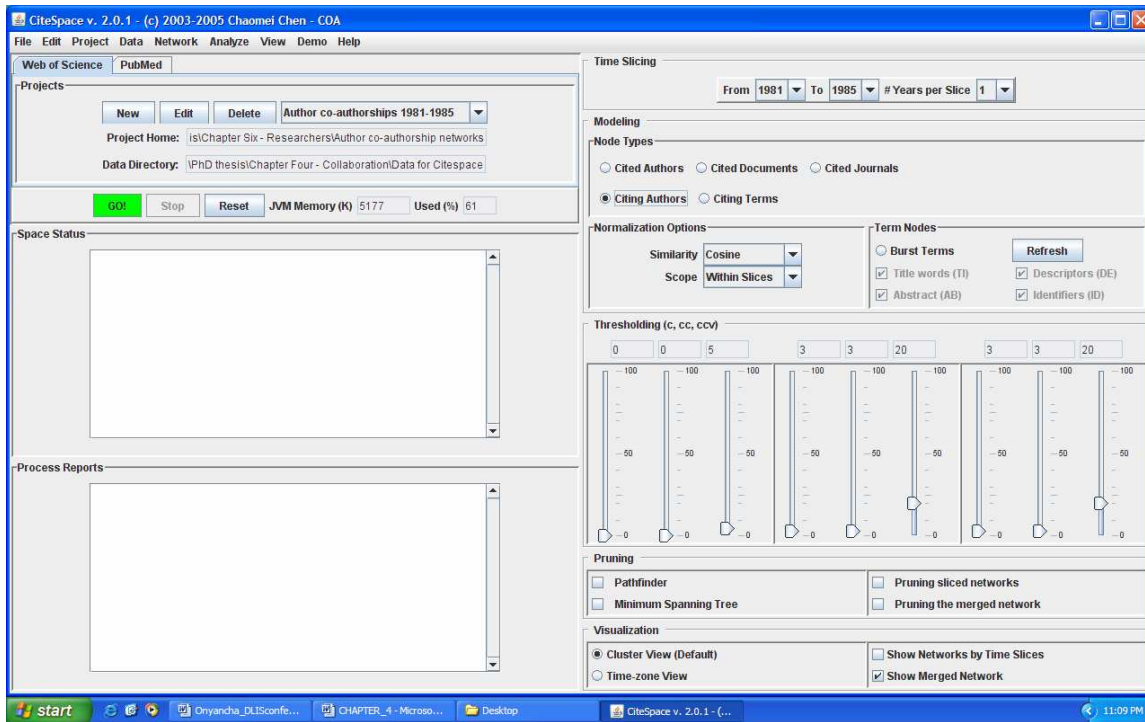
The networks that were generated in CITESPACE were not illegible nor were we able to clean them of certain errors, such as the presence of names of authors who satisfied the threshold requirements but did not belong to any network. Secondly, it was difficult to copy the generated networks to Microsoft Word for interpretation and presentation. Consequently, we exported the network data to UCINET[5] using the *Export to UCINET Network Format (DL)* option, where DL was used to identify the file as a data language file. We used *PAJEK,* one of the visualization programs integrated into *UCINET* analytic technologies, to produce the co-authorship networks presented in section 4. A 2-dimensional Fruchterman Reingold analysis was adopted to prepare the networks for legibility purposes. Finally, all stand-alone names of authors were deleted from the networks using Microsoft Corporation's Paint program (version 5.1, ©2001) in order to obtain clear and visible co-author social networks in Figs 2 to 7. Normalization options were set as 'Cosine' and 'Within slices' meaning that the program was commanded to draw similar (i.e. closely related participants) together using their cosines within the scope of the slices. The authors whose link strengths were presumed to be strong produced thicker lines as shown in Figs 2-7, i.e. the thicker the line (link) joining a pair of authors, the stronger their co-authorship. The strength values, generated by CITESPACE, are also provided to support the findings illustrated in the Figs.

4. Results and discussion

This section presents and discusses the findings using a time-series analysis approach, which was necessitated by the yearly classification of HIV/AIDS records as discussed in the methodology section, i.e. 1981-1985; 1986-1990; 1991-1995; 1996-2000; and 2001-2005. The

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[5] UCINET version 6 for Windows is a comprehensive package for the analysis of social network data as well as other 1-mode and 2-mode data. It can read and write a multitude of differently formatted text files, as well as Excel files. At this stage, we employed it to conduct a purely plain visualization of the co-author networks. For more information about UCINET, visit: http://www.analytictech.com/ucinet/ucinet.htm (Accessed 25 September 2007)

presentation and discussion of the countries of research focus for the entire period of study (i.e. 1980-2005) is provided in sub-section 4.7.

4.1   Growth of author collaboration networks, 1981-2005

As aforementioned, the nodes in a social network represent participating entities who, in this case are authors, while the links (i.e. lines joining a pair of nodes) represent co-authorship relationships. In order to measure the growth of the author co-authorship networks, uniform citation thresholds were set for each time slice of two years each. It was noted that both the number of nodes and links have continued to increase as shown in Table 1, thereby implying a continued growth of author collaborations. The number of nodes increased from 5 in 1984-1985 to 830 in 2004-2005, accounting for a percentage increase of 16500%. There were 4 links in 1984-1985 while 2004-2005 produced the highest number of links, i.e. 2067 links. One aspect of social networks that is worth mentioning here is the fact that the more the links per node in a network, the more the relationships amongst the network's participants. It therefore follows that 1994-1995 produced the highest number of links per node (i.e. 4.9), implying more relationships amongst the authors in the networks. As a matter of fact, the largest network comprising of 48 authors was recorded in 1994.

Table 1: Growth in the number of network nodes and links, 1982-2005

2-year slices	Citation threshold			articles	nodes		links	
	c	cc	ccv	no.	no.	increase	no.	increase
1982-1983	2	2	0.15	3	0	0	0	0
1984-1985	2	2	0.15	8	5	5	4	4
1986-1987	2	2	0.15	31	17	12	18	14
1988-1989	2	2	0.15	102	42	25	62	44
1990-1991	2	2	0.15	251	146	104	253	191
1992-1993	2	2	0.15	358	216	70	441	188
1994-1995	2	2	0.15	538	374	158	1837	1396
1996-1997	2	2	0.15	594	366	-8	949	-888
1998-1999	2	2	0.15	790	534	168	1321	372
2000-2001	2	2	0.15	1116	697	163	1911	590
2002-2003	2	2	0.15	1254	757	60	1754	-157
2004-2005	2	2	0.15	1322	830	73	2067	313

4.2   Author collaboration networks of HIV/AIDS literature in E&S Africa: 1981-1985

Fig 2 shows that there were two author networks that met the citation threshold requirements. It also illustrates that (not displayed in the illustration but shown on the accompanying Table immediately below the illustration) several individual authors met the set requirements but produced no networks. Each of the ties produced a strength value of 0.29, implying equal strength of collaborative links among all authors in a given network. Each network consisted of 6 authors.

Fig 2: Author co-authorship networks: 1981-1985
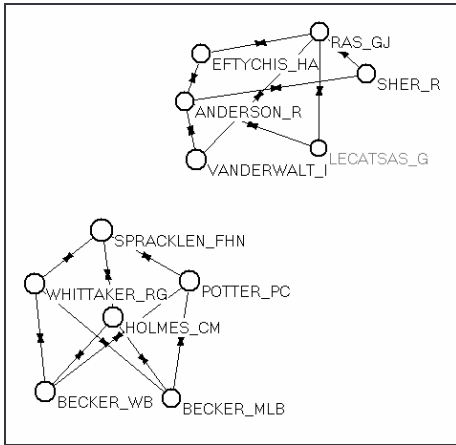
1-year slices	c / cc / ccv	space	nodes	links
1981-1981	0 / 0 / 0.15	0	0	0
1982-1982	0 / 0 / 0.15	0	0	0
1983-1983	0 / 0 / 0.15	10	10	10
1984-1984	0 / 0 / 0.15	28	28	53
1985-1985	0 / 0 / 0.15	11	11	16

Fig 3: Author co-authorship networks: 1986-1990
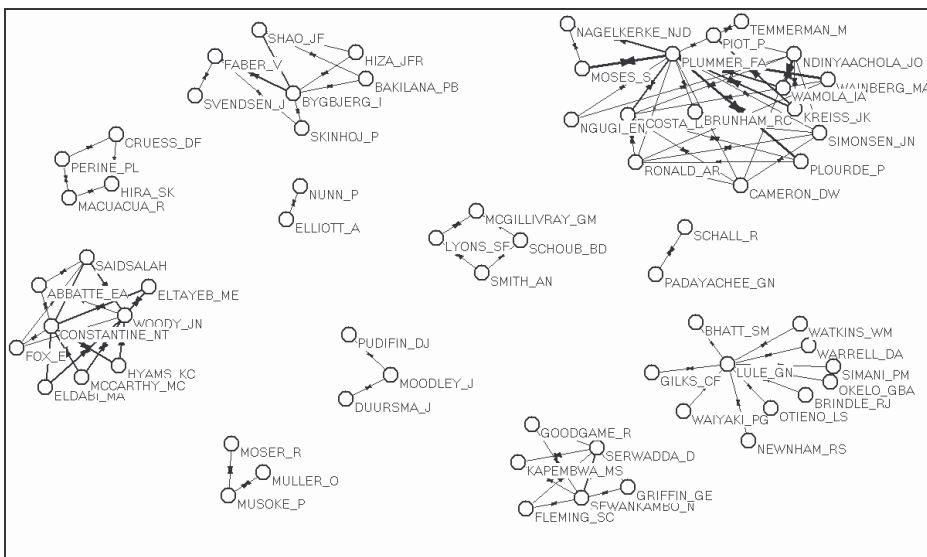
1-year slices	c / cc / ccv	space	nodes	links

1986-1986	*2 / 2 / 0.15*	*40*	*4*	*1*	
1987-1987	*2 / 2 / 0.15*	*139*	*14*	*17*	
1988-1988	*2 / 2 / 0.15*	*223*	*16*	*19*	
1989-1989	*2 / 2 / 0.15*	*303*	*33*	*42*	
1990-1990	*2 / 2 / 0.15*	*486*	*82*	*152*	

4.3 Author collaboration networks of HIV/AIDS literature in E&S Africa: 1986-1990

Fig 3 provides the authors' collaborative networks between 1986 and 1990. The illustration indicates that there were five major networks (i.e. networks that consisted of over 6 authors) that emerged during this period. The largest network comprised 15 authors, including Plummer FA, Ndinya-Achola JO, Cameron DW, Plourde P, Wainberg MA and others. The geographic research focus area of these authors was Kenya. Also worth noting is the absence of the two author networks of 1981-1985, which therefore suggests that all the eleven of the 1986-1990 author networks were new. It was observed that, unlike the previous year period, the 1991-1995 year period produced links of varied strengths. The highest tie strengths were recorded between Plummer FA and Wainberg MA (0.55); Plummer FA and Plourde P (0.55); Plummer FA and Moses S (0.55); Wamola IA and Ndinya-Achola J (0.53).

Fig 4: Author co-authorship networks: 1991-1995
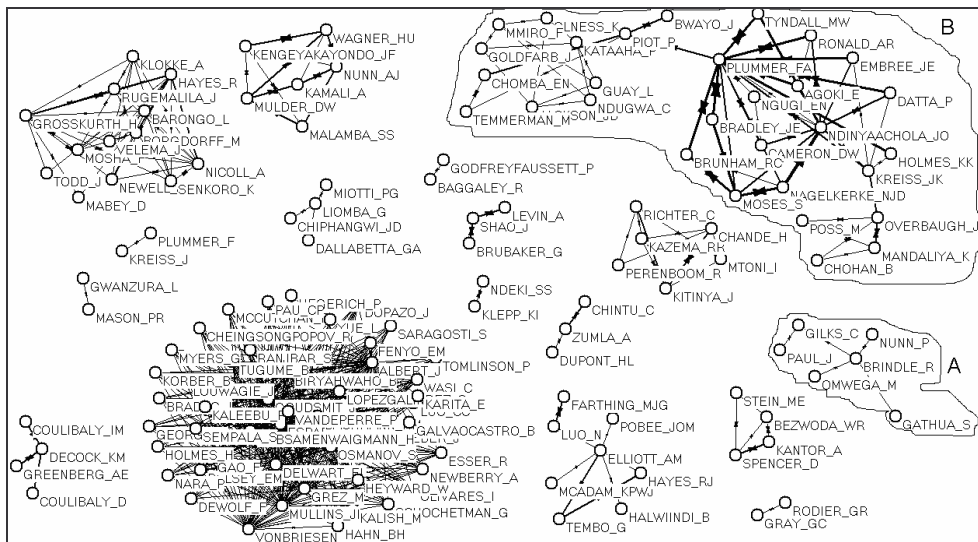
1-year slices	c / cc / ccv	space	nodes	links
1991-1991	*3 / 3 / 0.15*	*679*	*27*	*32*
1992-1992	*3 / 3 / 0.15*	*791*	*30*	*36*
1993-1993	*3 / 3 / 0.15*	*922*	*45*	*81*
1994-1994	*3 / 3 / 0.15*	*1229*	*106*	*1190*
1995-1995	*3 / 3 / 0.15*	*1571*	*80*	*55*

4.4 Author collaboration networks of HIV/AIDS literature in E&S Africa: 1991-1995

The 1991-1995 year-period yielded a total of 17 author networks as shown in Fig 4. The largest collaborative network stemmed from three authors, namely Biryahwaho B, Delwart EL and Esparza J, who produced over twenty links each. With the exception of two networks (marked A and B and circled) that had the names of some of the authors who had featured in the previous year-period's collaborative network, the networks that met the set threshold

requirements for the 1991-1995 year-period were largely new. Networks A and B reveal that
the key authors were Brindle R in network A, and Plummer FA, Nagelkerke NJD, Brunham
RC, Ndinya-Achola JO, and Piot P in network B. These authors produced majority links with
other authors in the same networks. The strengths of the co-authorship ties were as follows:
Ndinya-Acholla JO and Nagelkerke NJD (0.67); Plummer FA and Agoki E (0.57); Ndinya-
Acholla and Tyndall MW (0.5); etc.

4.5   Author collaboration networks of HIV/AIDS literature in E&S Africa: 1996-2000

Fig 5's author collaborative network consists of a total of 18 networks, with several names of
authors that appeared in the previous year-period (see Fig 4) featuring prominently. The
networks that contain previously active collaborators are marked C-H. An observation
derived from these networks is the participation of new authors that previously had either
not featured anywhere (so to speak), or partnered with other authors in different
collaborative activities. For instance, some names in network C (e.g. Plummer FA,
Nagelkerke NJD, Ndinya-Achola JO, Mandaliya K, etc.) formed a part of network B in the
previous year-period. The new names in network C include Kimani J, MacDonald KS, and
Moses S. Generally, each of these networks witnessed the entry of new names. A further
observation that can be made is the split of network B into two networks in 1996-2000 (i.e. C
and F). It can also be seen that several new networks emerged in 1996-2000 as illustrated by
those that are unmarked. Most of these networks remained in place in the first-half of this
decade (2001-2010). Another notable aspect was the lower strength values of the links among
the authors when compared with the previous year period's values. The highest strength
value was recorded between Bwayo JJ and Mandaliya K (i.e. 0.54) while the rest of the links
produced strength values of less than 0.5. This pattern was also witnessed in the 2001-2005
year period, a situation that may imply less collaboration activities among the same authors.

Fig 5: Author co-authorship networks: 1996-2000
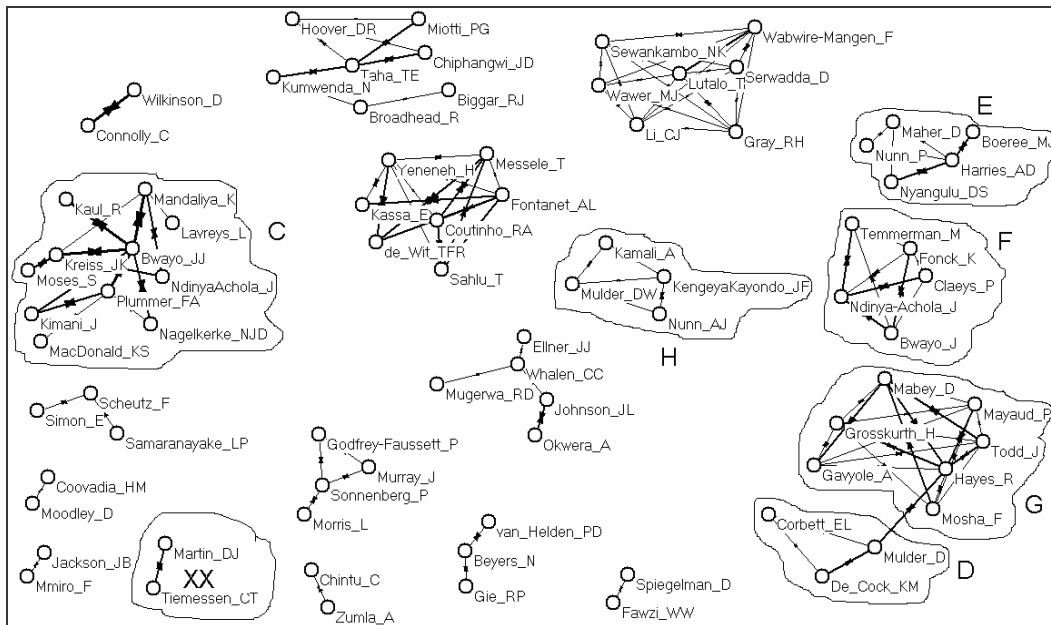
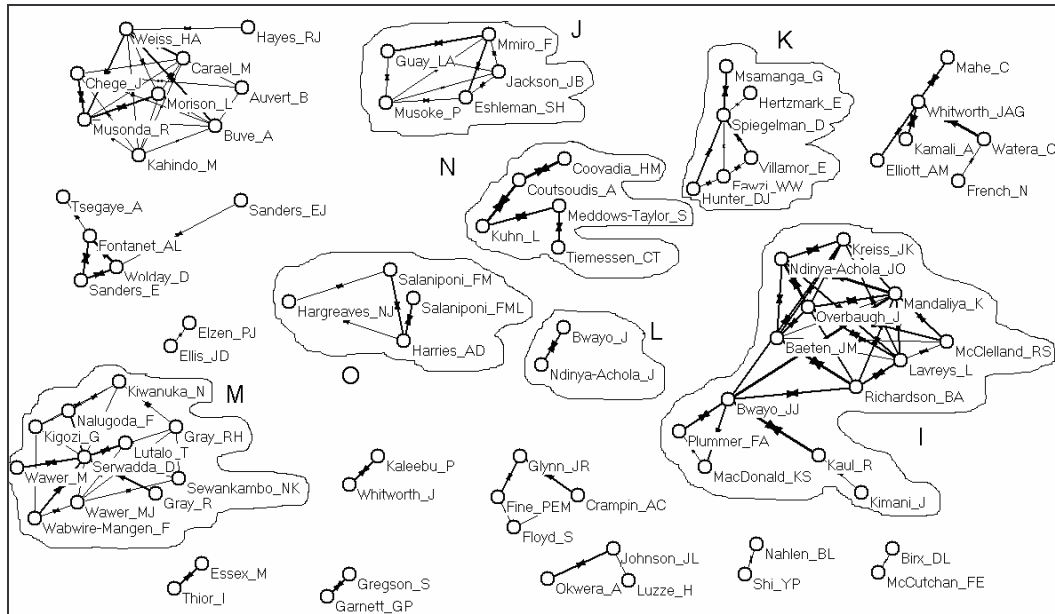| 1-year slices	c / cc / ccv	space	nodes	links
1996-1996	4 / 4 / 0.15	1362	19	6
1997-1997	4 / 4 / 0.15	1654	43	41
1998-1998	4 / 4 / 0.15	1728	44	12
1999-1999	4 / 4 / 0.15	2084	72	56

2000-2000   4 / 4 / 0.15   2474   84   37

4.6   Author collaboration networks of HIV/AIDS literature in E&S Africa: 2001-2005

Fig 6 provides 18 co-authorship networks for the period 2001-2005. Several of these networks (7 out of 18) existed in, or comprised authors who had formed some of the networks between 1996 and 2000. These are marked I-O. It should, however, be noted that most of these networks contained a number of names that did not feature in the previous year-period(s). Take for instance network N. The network was thought to have originated from the network marked XX in Fig 5. At the time (i.e. 1996-2000), the network contained two names (i.e. Martin DJ and Tiemessen CT) in 1996-2000. By 2001-2005, the number of the participating authors had grown to 5. Four of the names were new. Similarly, network K comprised two names (i.e. Fawzi WW and Spiegelman D) in 1996-2000. This pattern of previously active authors sometimes appearing to disappear from the collaboration scene with new ones entering into partnerships with a few of the remaining authors is true in most networks throughout the period of study. Just as in 1996-2000, 2001-2005 produced only one strength value that was above 0.5. A tie strength value of 0.56 was recorded by Kuhn L and Coutsoudis A. The rest of the ties produced strength values less than 0.5.

Fig 6: Author co-authorship networks: 2001-2005

1-year slices	c / cc / ccv	space	nodes	links
2001-2001	*5 / 5 / 0.15*	*2671*	*69*	*54*
2002-2002	*5 / 5 / 0.15*	*2848*	*55*	*19*
2003-2003	*5 / 5 / 0.15*	*3092*	*41*	*15*
2004-2004	*5 / 5 / 0.15*	*3692*	*70*	*50*
2005-2005	*5 / 5 / 0.15*	*3128*	*29*	*14*

4.7   Geographic regions of research focus of author co-authorship networks, 1981-2005

Fig 7 provides an illustration of several author collaborative networks in E&S Africa for the entire period of study (i.e. 1980-2005). Threshold requirements were set at 7 citations, 7 co-citations and a co-citation coefficient of 0.2. There were a total of 16 networks labeled A to O, in descending order (i.e. according to the number of authors in each network). The Fig shows

that the sizes of the networks ranged from 2 to 48 authors. It identifies the largest network, i.e. A, as consisting of 48 authors, while the smallest network has 2 authors.
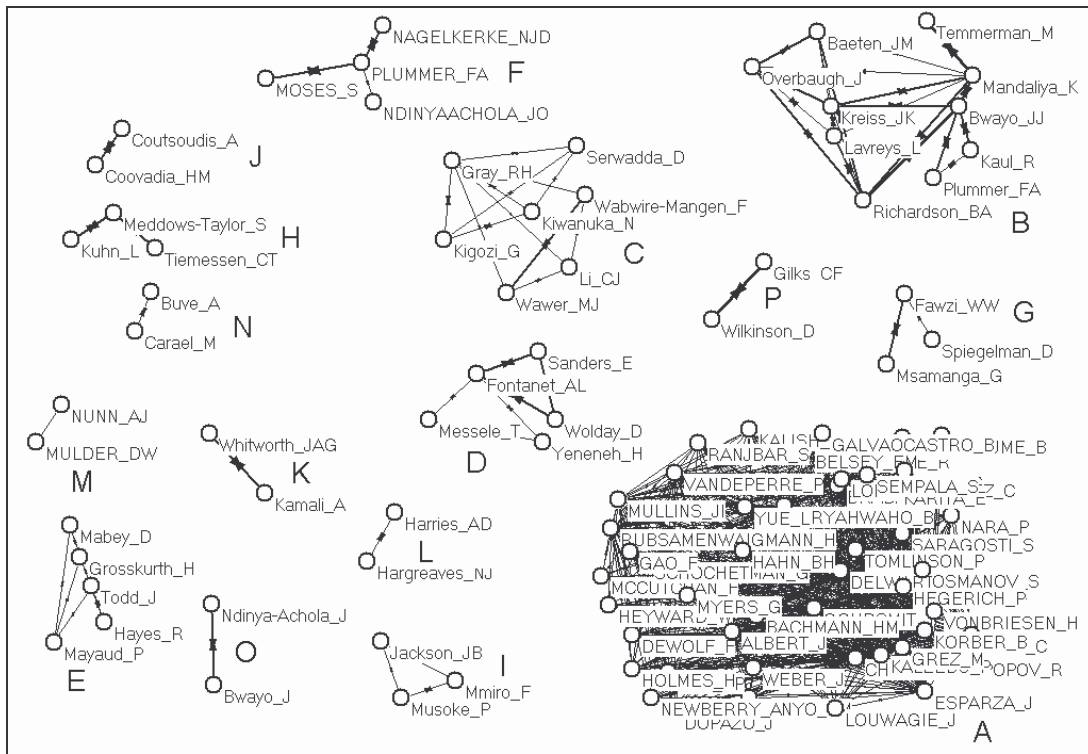
Fig 7: Author co-authorship Networks, 1981-2005

Thresholds: c = 7, cc=7, ccv = 20 (or .20), nodes = 103, E = 1194

In considering the composition of the networks in Fig 7, it was found that network A consisted of authors from a number of different institutions and countries. It has the largest number of authors as well as the broadest geographical coverage. The authors' country and institutional affiliation include, but are not limited to, South Africa (e.g. Bachmann HM, University of the Orange Free State, Dept of Community Health; and Holmes H, University of the Western Cape, Faculty of Dentistry), Sweden (e.g. Albert J., Karolinska Inst, Swedish Inst Infect Dis Control & Microbiol, Dept Virol; Fenyo EM., Karolinska Inst, Microbiol & Tumorbiol Ctr.) and the USA (e.g. Gao F., Duke Univ, Med Ctr, Dept Med.; Hahn BH, Univ Alabama, Dept Med.; Korber B., Los Alamos Natl Lab.; Delwart EL, Blood Syst Res Inst.; Mullins JI, Univ Washington, Sch Med, Dept Microbiol.). Others include Holmes H. (Imperial Coll Sch Med, Chelsea & Westminster Hosp, Dept Immunol, London, England), Kaleebu P. (Uganda Virus Res Inst, MRC, Programme AIDS Uganda, Entebbe, Uganda), Lopez-Galindez C. (Inst Salud Carlos III, Ctr Nacl Microbiol, Madrid, Spain), Luo CC (Zhejiang Univ, Key Lab Mol Design & Nutr Engn, Ningbo Inst Technol, Ningbo, China), Osmanov S (WHO, UNAIDS HIV Vaccine Initiat, Geneva, Switzerland), Saragosti S (INSERM, IMEA, Paris, France), and Esparza J (WHO, UNAIDS HIV Vaccine Initiat, Geneva, Switzerland). The authors' research focus was Uganda.

Network B, which is the second largest author network, consisted of ten authors who met the threshold requirements. They include Baeten JM (Univ Washington, Dept Epidemiol,

Seattle, USA), Bwayo J (Univ Nairobi, Dept Med Microbiol, Mombasa, Kenya), Kreiss JK (IARTP, Seattle, USA), Lavreys L (Univ Washington, Dept Epidemiol, Seattle, USA), Mandaliya K (Coast Prov Gen Hosp, Mombasa, Kenya), Overbaugh J (Fred Hutchinson Canc Res Ctr, Div Human Biol, Seattle, USA), and Plummer FA (University of Manitoba, Dept of Medical Microbiology, Canada). Others in this collaborative network are Richardson BA (Richardson BA (Univ Washington, Dept Biostat, Seattle, USA) and Temmerman M (State Univ Ghent, Dept Obstet & Gynaecol, ICRH, Ghent, Belgium). This group of authors mainly focused on HIV/AIDS in Kenya.

Network C – whose focus was Uganda – brought together authors from the USA and Uganda. These authors include Kiwanuka N (Uganda Virus Res Inst, Rakai Project, Entebbe, Uganda), Wawer MJ (Columbia Univ, Mailman Sch Publ Hlth, New York, USA), Wabwire-Mangen F (Makerere Univ, Inst Publ Hlth, Kampala, Uganda), Gray RH (Johns Hopkins Univ, Bloomberg Sch Publ Hlth, Dept Populat & Family Hlth Sci, Baltimore, USA) and Serwadda D (Johns Hopkins University, USA). Uganda was also the country of focus in network I, where the main players were Jackson JB (Johns Hopkins University, Baltimore, USA), Mmiro F (Makerere University, Dept Obstet & Gynaecol., and Kampala, Uganda) and Musoke P (Makerere Med Sch., Dept Paediat & Child Hlth, and Kampala, Uganda).

Network D focused on Ethiopia, while networks' E's and G's research activities centered on Tanzania and network F concentrated on HIV/AIDS research in Kenya. The main participating collaborators in Ethiopia were Fontanet AL (Inst Pasteur, Emerging Dis Epidemiol Unit, Paris, France) and Wolday D (Ethiopian Hlth & Nutr Res Inst, EthioNetherlands AIDS Res Project, Addis Ababa, Ethiopia), among others. Tanzania's key collaborators in network E were Mayaud P (Univ London London Sch Hyg & Trop Med, Dept Infect & Trop Dis, London, England), Todd J (Univ London London Sch Hyg & Trop Med, London, England), Hayes RJ (Univ London London Sch Hyg & Trop Med, Dept Infect & Trop Dis, London, England), Mabey D (Univ London London Sch Hyg & Trop Med, Dept Infect & Trop Dis, Clin Res Unit, London, England), and Grosskurth H (Univ London London Sch Hyg & Trop Med, Dept Infect & Trop Dis, London, England). Network G has Msamanga G (Muhimbili Univ, Coll Hlth Sci, Dept Community Hlth, Dar es Salaam, Tanzania) and Fawzi W (Harvard Univ, Sch Publ Hlth, Dept Nutr, Boston, USA). Moses S (University of Manitoba, Dept Med Microbiol Winnipeg, Canada), Plummer FA (University of Manitoba, Dept of Med Microbiol, Canada), Ndinya-Achola JO (University of Nairobi, Kenya) and Nagelkerke NJD (University of Manitoba, Dept of Med Microbiol, Canada) are the key authors in network F whose focus was Kenya.

Other networks (J-P) largely consisted of two collaborators, and their main countries of research focus were as follows: J – South Africa, K – Uganda, L – Malawi, M – Uganda, N – Zambia, and O – Kenya. Although their centers of research activity were not clearly identified in this study, each group of authors can be said to be involved in research in the countries being researched. The results also show that Uganda produced the highest number of author networks (i.e. 5), followed by Kenya (3); while South Africa and Tanzania produced two networks each. Ethiopia, Malawi and Zambia were each represented in one collaborative network.

4.8   Most productive pair of authors

The highest contribution between two authors came from Ndinya-Achola JO and Plummer FA, who contributed 46 papers, followed by Wawer MJ and Serwadda D (44), Gray RH and Serwadda D (43), and Gray RH and Wawer MJ (42). The rest of the top 10 two-author collaborators were as follows: Richardson BA and Kreiss JK (39); Overbaugh J and Kreiss JK

(38); Mandaliya K and Kreiss JK (38); Mmiro F and Jackson JB (37); Plummer FA and Bwayo JJ (36); Plummer FA and Negelkerke NJD (32); and Lavreys L and Mandaliya K (32).

Table 2: Most productive collaborations (N = 6367)

No.	Rank	Author-A	Author-B	No of records	Percentage
1	1	Plummer FA	Ndinya-Achola JO	46	0.72
2	2	Wawer MJ	Serwadda D	44	0.69
3	3	Serwadda D	Gray RH	43	0.68
4	4	Wawer MJ	Gray RH	42	0.66
5	5	Richardson BA	Kreiss JK	39	0.61
6	6	Overbaugh J	Kreiss JK	38	0.60
7	6	Kreiss JK	Mandaliya K	38	0.60
8	7	Mmiro F	Jackson JB	37	0.58
9	8	Plummer FA	Bwayo JJ	36	0.57
10	8	Serwadda D	Sewankambo NK	36	0.57
11	8	Harries AD	Salaniponi FM	36	0.57
12	9	Wawer MJ	Sewankambo NK	35	0.55
13	10	Sewankambo NK	Gray RH	35	0.55
14	11	Biberfeld G	Mhalu F	33	0.52
15	12	Plummer FA	Nagelkerke NJD	32	0.50
16	12	Nagelkerke NJD	Plummer FA	32	0.50
17	13	Overbaugh J	Mandaliya K	31	0.49
18	14	Mmiro F	Ndugwa C	30	0.47
19	15	Coovadia HM	Coutsoudis A	29	0.46
20	15	Grosskurth H	Hayes R	29	0.46

5.   Conclusions and recommendations

Generally, it is noted that there has been a continued growth in the number of collaborative networks. The networks grew from just two in 1981-1985, to a total of 18 in 2001-2005, accounting for a growth rate of about 800%. Obviously there were more networks than these since the networks that are presented in Figures 2 to 7 are only those that met specific threshold requirements. This growth pattern of collaborative networks could be attributed to several reasons, chief among them, the complexity as well as cost of HIV/AIDS research. This, compounded by the lack of a cure for the disease, may have led researchers to seek alliances. The pattern may have also been caused by more students (particularly post-graduates) jointly authoring papers with their academic promoters. Other factors that generally influence collaboration amongst researchers include personal reasons (e.g. trust, expertise, social networks, personal compatibility, common professional traits); resource-related factors (e.g. support from funding agencies, support from scientists' institutions, literature, scientific publishing, students, time); motivational factors (e.g. learning and teaching, new discoveries, fun, external rewards); and "common ground" factors (e.g. physical proximity, research organizations, disciplinary bias, discipline-specific languages, bridges), etc. (Maglaughlin & Sonnenwald, 2005:507).

Figures 2 to 6 also indicate that a number of collaborative networks have recently emerged, while several others that previously existed have disappeared, or are on the verge of disappearing, from the most active author networks. It would be interesting to investigate the factors that cause or might have caused such patterns. Most probably, this phenomenon could be caused by the completion of a project, which would mean that researchers do not have any reason for continued cooperation, unless they register for further projects. This includes post-graduate students' projects which are largely conducted jointly with promoters. Once the students complete their studies, they are likely to discontinue their research collaboration with their promoters. Although very rare, the non-completion of a project due to factors such as the misappropriation of research funds, mistrust, dissatisfaction on the part of some researchers, etc., may also cause the break up of a collaborative network. Sometimes, author networks can be dissolved when their participants form new alliances, become incapacitated or die. Finally, donor funding may dictate the type of researchers who are incorporated into a network. These factors, and many others, also may have influenced the movement of some researchers from one network to another. None of these factors could, however, be confirmed from the analyses in Fig 2 to 6. Great caution is necessary when making generalized observations and conclusions given that the networks in Fig 2 to 6 were only those that met the threshold requirements. Some of the authors may have continued to participate in their respective author networks, but perhaps did not meet the set thresholds and therefore did not feature in the illustrations. It could not, therefore, be concluded that certain researchers had totally disappeared. They may have become less active.

The composition of the social networks reflects a high pattern of collaboration between local and foreign researchers. The study has shown that collaboration is gaining recognition, perhaps as a result of the benefits associated with it. HIV/AIDS research in the region is currently being conducted largely through collaboration. Countries in the region are therefore encouraged to continue supporting collaborative ventures in HIV/AIDS research given that research collaboration increases research impact, among other benefits. They should encourage both internal and international collaboration – the latter being for purposes of international visibility and impact – by [for example] organizing international conferences within E&S Africa during which researchers can exchange ideas, and in so doing, identify researchers from other countries with whom they can collaborate. Conferences can also be held to find out ways of strengthening collaboration in HIV/AIDS research. A few conferences have previously been organized and held in order to discover ways and means of strengthening HIV/AIDS research collaboration between the developed countries and Africa. One such conference was organized by the Africa Program of the Center for Strategic and International Studies (CSIS) and the Brookings Institution's Center on the United States and France (CUSF); to find ways of strengthening U.S-French collaboration on HIV/AIDS in Africa. The aim was to identify new opportunities for active collaboration between France and the United States in combating HIV/AIDS in Africa. The focus areas included the importance of HIV/AIDS to U.S. and French foreign policy and security assessments, the disease's likely destabilizing impact on African states, the role of the Global Fund to fight AIDS, TB, and Malaria, and the need for closer collaboration between U.S, French, and African researchers, policy makers, and program implementers. It was noted that local participation was highly necessary in order for any successful research collaboration effort to take place (Morrison & Gordon, 2001).

Concerning future HIV/AIDS research collaborations, this study may assist researchers in identifying potential collaborators as opined by Boyack (2007). Boyack (2007) argues that potential collaborators can be identified by way of visualizing patterns of co-authorships using social networks in one or more disciplines. He does, however, hasten to add that:

"*Just because a potential collaboration is identified based on a common topic focus, this does not necessarily mean that collaboration should occur. Many factors are typically considered when choosing collaborations, including funding, detailed skill sets, and personal relationships*" (Boyack, 2007:134)

The following should form an agenda for further research:
1. To what extent do conferences and other similar gatherings of researchers affect HIV/AIDS research collaboration?
2. How much of the 'networking' at conferences results in active collaborations?
3. What are the main sub-fields of HIV/AIDS research represented in each social network?
4. What are the relationships represented by the links in each social network? Are the authors colleagues in the same department, student and lecturers, colleagues in the same institution, etc?

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Special Libraries in Africa: Challenges and Trends

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Introduction

While the concept and term 'special library' came into use only in the early 1900s, the very first libraries in the world were what we would today recognize as special libraries.

Many corporations, private businesses, financial institutions, museums, hospitals, government departments and agencies, non-governmental organizations, and other institutions establish and maintain their own libraries to serve the specialized needs of their employees or members.

The concept of special libraries has still not been clearly defined, and many opinions and definitions are in circulation. Poll (2007) notes that in most cases, definitions point to what a special library is not, rather than indicating what it is.

Many library types are included in the term, i.e. law libraries, news libraries, corporate libraries, museum libraries, government libraries and non-profit organization libraries. Consequently, a lot of their boundaries overlap with other types of libraries. For example, although many special libraries are open to the general public, they are still not seen as public libraries because the information they contain is of a specialized nature (Bauer (2003).

The ownership of these libraries also ranges from being privately owned, to being owned by non-governmental agencies, commercial firms, and government and its departments. The Statistics and Evaluation Section of IFLA (2007) sees special libraries as libraries situated within the workplace, or libraries belonging to professional societies and non-profit organizations. From the above, it is clear that ownership does not necessarily define whether or not a library is seen as a special library (Bauer 2003).

Consensus does exist about the fact that special libraries serve a very specific clientele, in most cases a very small group of users with very specific requirements, and have highly specialized collections concentrating on a specific subject or field. Alternatively, they concentrate on a specific form of documentation. In most cases, they are also served by a very small staff component (Bauer 2003, Poll 2007; Statistics and Evaluation Section of IFLA 2007).

Although these libraries are generally known as special libraries, they are also sometimes known as Information Centres, Information Analysis Centres, Documentation Centres, Information Resource Centres or Knowledge Management Centres.

The role of a special library is very closely linked to its parent institution's activities, and is mainly focused on making available whatever knowledge and expertise is necessary to further these activities. This implies the existence of knowledgeable staff, not only in terms

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of library expertise but also in terms of specialized subject knowledge (Lefebvre 1996). According to Poll (2007:4), service delivery is based on the following main tasks:

- A collection that is tailored to suit the needs of its clientele
- The speed and accuracy of reference services
- Proactive delivery of relevant information to users
- Customized user services (personal profiles, alerting services, selective dissemination of information)
- Efficient background services
- Cost-efficiency of services

Depending on the clientele, special library collections aim to serve the specific needs of the organizations they serve and to increase the productivity and efficiency of the parent organization. This is achieved by reducing the time that employees spend searching for data and by providing information that can facilitate improved decision making.

Development of special libraries in Africa
According to Sturges and Neill (1990), the development and growth of special libraries is seen as the most vital growing point in African librarianship. Most start out on a small scale and without too many information resources (a few publications and files and some journals and/or information service subscriptions) and many special libraries come into existence without really planning for it to happen. It is only at a later stage that funding, budgeting and the employment of qualified staff become prioritized.

According to Sitzman (1988), the first special libraries in Africa were established during the turn of the nineteenth century by colonial governments, though special libraries already existed in Egypt and South Africa prior to that date. The early libraries were designed to assist the colonial administrators and to reflect the colonial government's interests in medicine, agriculture and geology, etc. These libraries had few trained members of staff, few publications and were serving the research officers at their institutions (MSN Encarta, 2007).

The special libraries attached to national geological surveys proliferated, and by 1967, about 20 already existed (Sturges and Neill 1990). Due to the lack of trained staff, qualified geologists acted as information officers. Their collections consisted of relatively few books but plenty of reprints, pamphlets, maps, microforms and photographs.

Currently, special libraries in the agricultural sector are the most prolific, as a number of research institutes are concerned with this sector. In most African countries, the ownership of these libraries rests in the hands of government departments and agencies.

According to Sturges and Neill (1990), most special libraries are insufficiently funded, and the collections, buildings and services are inadequate. However, they still play a fundamental role in providing resources to the researchers, and can potentially be an important instrument in providing information to the target groups of each of the parent organizations.

In Africa, the establishment and maintenance of special libraries are closely related to political stability and economic growth. Within regions, there can be huge disparities in the existence of these libraries. For example, in the Southern African region, South Africa has more than 600 special libraries, while its neighbours Namibia and Botswana only have a few. In North Africa, a similar situation is illustrated, with Egypt having more that 380 special libraries and Liberia only 6 (Wertsman, 1996).

Collection sizes vary from library to library, and can range from relatively big collections in the region of 60,000, as is the case with the United Nations Economic Commission for Africa Library in Ethiopia, to less than 500 volumes (such as the collections of special libraries in Sierra Leone) (World encyclopedia of Library and Information Science 1993). While most collections are still print-based, many are currently also supplemented with digital access to information (Mutula n.d).

Many of the existing special libraries have been developed with donor or foreign funding, which sometimes leads to insufficient planning and oversights in terms of catering for African needs (Dimitroff, 1993, Baldwin & Varady, 1989)

Special libraries: regions

Southern Africa

Within this region, huge disparities in terms of the availability of special libraries are evident. In a country like South Africa, special libraries abound, while most of its neighbouring countries have less than 70. While most of the special libraries in this region are owned by the government or parastatals, South Africa is an exception, as only 79 libraries are affiliated to government agencies, and the rest are attached to private companies in the commercial and technological sector, mining houses, the financial sector, and private individuals. Malawi's special library history dates back to 1899, when the first agricultural library was established. Currently, most special libraries in this country are still found in the agricultural sector.

Zimbabwean special libraries are mainly found within major cities, and although the government is the biggest owner of these libraries, some are also found amongst NGO's. The most notable library in this country is the Southern African Research and Documentation Centre, which not only serves its own institution, but also the South African Developing Countries region. The library's services include, among others, the production of yearbooks and other regional publications. In Zambia, with libraries specializing in the fields of natural sciences, agriculture, law, education, banking and mining, a very productive informal interlibrary lending scheme exists between special libraries and the country's main university.

North Africa

In this region, the disparity between countries that have special libraries and those that don't is probably at its most acute. For example, while there is no evidence of libraries in Libya, Morrocco, and Mauritania, Egypt has a relatively well developed special library system.
Some countries in this region, like Egypt, probably have some of the oldest special libraries in the world's history, dating back many centuries. Currently, political and economic instability have proven to be a major deterrent in the establishment and maintenance of special libraries in the majority of the countries in this region.. Many of the libraries in this region were established with donor-funding, often resulting in expensive and ineffective document delivery systems. Egypt has the best and most established special library system in the region, with over 380 special libraries in the country, most of which belong to government departments, semi-government institutions and learned societies. Special libraries in countries like Liberia are mainly underdeveloped and highly disorganized due to a lack of trained staff, proper funding and space. In Algeria, libraries are mostly affiliated to schools and institutes specializing in commerce, the fine arts, agriculture, hydrography and engineering.

West Africa

The quality of libraries in this region ranges from good to very poor, although not much information on library holdings is available outside each institution. Nigeria has the most libraries in this region (70), most of which belong to government agencies or private organizations. Libraries with very good collections are under the auspices of research institutions. In Sierra Leone, a definite distinction is made between special libraries (associated with professional and learned societies, government departments and research centres); information centres - associated with government, research and industrial establishments providing very specific information; and documentation centres, which also process literature in their respective fields.

In the Congo, the Board of Libraries, Archives and Documentation is the central management, coordinating and supervising organ for all library, archive and documentation centres, but it is not a very effective organ as it only concentrates on specific special libraries, leaving others to fend for themselves.

Eastern Africa

The first special libraries in this region were established at the turn of the nineteenth century in Kenya. Though many followed during the ensuing years, most ceased to exist with the collapse of the East African Community in 1967. However, after independence, many new libraries were developed within the government departments and by private organizations. The best run libraries are those found in research institutions.
In Tanzania, most libraries belong to the Ministry of Agriculture, which does collection development centrally and then disperses the resources to other branches. Ethiopia also has special libraries belonging to religious organizations dating back many centuries.

Status of special libraries/librarianship
Nature of special libraries

The fate of a special library is closely related to that of its parent organization and to the perceptions held by the parent organization of its worth. Within the African continent, library systems in general are underdeveloped and constrained, and in many cases there is **a** general disillusionment about libraries' lack of achievements and the inability of librarians to show their worth (Nwalo 2000) the low status and esteem afforded librarians often results in marginalization, understaffing, underdevelopment and under-resourced facilities. For special libraries, this is of grave concern, as it renders them ineffective in the eyes of others and therefore makes them expendable (Kebede 1999)

Because of the relationship between the special library and its parent organization, the library's continued existence is dependent on the continued existence of the parent organization. In times of political and economic upheaval, as is the case now in Zimbabwe, many of these libraries cease to exist. With their demise, a wealth of information is also lost.

Training

At first, training within libraries was mainly done internally by expatriate librarians, with a chosen few sent abroad for further studies. This entrenched a value system alien to the African situation – a situation that is still not totally rectified today, although African library schools are in the process of Africanizing their library programmes bring it more in line with the specific needs and circumstances of the African clientele to be served.

The current training of librarians equips them with the skills they need to perform mostly traditional library tasks, such as classification, cataloguing and referencing, but this is also

in a predominantly print medium. With today's technological advances, instruction using ICTs is also imperative. Currently, many African LIS schools offer information technology courses as part of their curriculum (Ocholla and Bothma, 2007 & Nwalo, 2000). However, Aina (1994) warns that even though ICT skills are important, within the African continent, local conditions might not necessarily be conducive for their implementation.

Aina (1994) posits that the training of special librarians should include two components, i.e. information technology skills training and subject specialization; since they work in environments where they must be able to provide information pertaining to specific subjects. An important feature within the special library environment is the information and not the source itself. Special librarians should therefore be trained to extract, summarize, and disseminate information effectively.

The continuous upgrading of skills should be a requirement for special librarians because the current business environment is constantly changing, and this necessitates new skills and competencies. Competencies that are currently required include: "*knowledge of relevant information sources, access, technology and management, and the ability to apply this knowledge to provide a high quality information service*" (Muller, 2007). Currently, there appears to be a dire lack of continuous education programmes in most African library schools, and those offering programmes do not seem to be current or relevant (Ocholla and Bothma, 2007). In South Africa, some initiatives are currently underway through Continuing Education and Professional Development (CEPD and the Centre for Information Career Development (CICD) (Ocholla and Bothma, 2007). Due to the lack of opportunities for continuous education, special libraries have to rely on workshops and conferences in order to build the skills of their staff.

Library networking

The concept of networking is of crucial importance to African special libraries because of the dearth of information resources and financial constraints. Many formal and informal networks currently exist amongst special libraries, for example libraries in Egypt, Botswana and Zambia are cooperating in the fields of information sharing and in the sharing of staff knowledge and expertise. Networks that extend past country borders, e.g. the SABINET system in Southern Africa, also exist (Jalloh, 1999). Some special libraries also network with special libraries affiliated to international organizations, such as the British Council, since these libraries have bigger budgets and better access to information resources from abroad. Sanni in Nawe (2000) reports that a number of information networks exist in Africa allowing the sharing of information and resources. Most notable in terms of special libraries is PADISNET (Pan African Documentation Centre Network), which aims to connect centres performing research on development planning in African countries into a network for data and information exchange. A major problem with most of the formal networks is that they are initiated and sustained by donor bodies from outside Africa, making them vulnerable should the bodies withdraw their support.

ICTs and Library automation

Within Africa, the introduction of ICTs and the automation of library processes and services are severely hampered by an inadequate infrastructure, the cost of access to information, inappropriate or weak policy regimes, inefficiency in the provision of telecommunication networks, language barriers, and the lack of locally created content, to name a few (Mutala, n.d). This is compounded by the high cost of telecommunications services.

When businesses started realizing that access to speedy information gives them the edge in the competitive business environment, funds were made more readily available for the purchase of computer equipment (Chisenga, 1995). Library automation in Africa started on a

very small scale in the early 1980's, with special libraries spearheading the process. Special libraries with access to funding, such as the British Council Information Centres and the United States Information Services, were among the first special libraries to automate their services. Automation was mostly implemented by IT Departments and computer centres using local programming experience. In the late 80's, UNESCO provided free software to libraries in the government, public and private sectors, enabling them to use CDS/ISIS software that aided them with the development of in-house databases for their local collections (Mutala n.d). Countries such as Nigeria, Botswana, Egypt and South Africa have taken the lead in library automation amongst special libraries, with other countries, such as Ethiopia (Tsigemelek, 2006), having implemented automation programmes but in varying degrees. Although web-based systems became the norm from the early 90's in many libraries world-wide, only a few libraries in Africa have yet created a web presence and web-services.

Nwalo (2000) believes that the shortage of skilled manpower to implement IT programmes in African libraries is a major problem. For example, Botswana's special libraries experienced many problems in the implementation of ICTs due to the lack of computer literate staff. This lack of experience also influences the selection and acquisition of applicable software programmes. In many cases, software selection is based on reports received from other users at conferences, and not on a thorough systems analysis (Adogbeji n.d). Alternatively, they have to rely on vendors of computer systems for both their hardware and software selections (Tiamiyu in Adogbeji, n.d.). Nwalo (2000) believes that the implementation of Information Technology courses in African library schools will eventually overcome the current manpower shortage.

Telecommunications infrastructure
Despite being the world's most rapidly growing market for mobile telephony and also one of the fastest growing fixed telephony markets in the world, Africa still has some of the world's lowest penetration rates.
A number of reforms have recently been instituted by African governments, and much has been done to liberalize and privatize the telecommunications market. Many countries have adopted the GSM system, which boosts the overall availability of telephone lines. By mid 2002, Africa (excluding South Africa) had 560 public ISPs. Despite this, computer penetration remains low and internet penetration even lower still, with the internet seen as a luxury item restricted to certain institutions and groups. The average Dial-up Internet cost in mid-2002 was $60, and ISP rates varied between $10 and $80. Serious problems hindering Internet adoption include thin bandwidth, non-existing intra-regional connectivity, and an inefficient fixed line network which is constrained by inter-exchange congestion. In addition, African countries suffer erratic power supplies while their per capita electricity consumption is low (Oyelaran-Oyeyinka & Adeya, 2004).

Challenges

Benchmarking
Due to their unique nature, special libraries and librarians are required to demonstrate to the top management that they are getting a good return on their investment in the library (Nicholas 2007). According to Henczel (2007), the environment within which special libraries exist is one of emerging technologies, evolving user expectations, diminishing budgets, ever-changing cultural climates and competing organizational priorities. Benchmarking is defined as a process of improving performance by constantly identifying, understanding and adapting best practices and processes, which are followed inside and outside the company, and implementing the results (Jurow and Barnard in Nicholas, 2007:n.p.).Currently, little or no benchmarking activities are performed in African special libraries. In order to become

relevant and truly integrated into their organizations, it is imperative that special libraries implement and prioritize strategic measurement processes, such as measuring what is necessary to provide services, the impact of their information services on the business, strategic objectives, projects etc; and by characterizing their user population in terms of size, location and needs.

Local content creation

Mchombu (2007) laments the fact that the content of most information centres in Africa reflect on global trends rather than on local language content which would be more relevant to local situations. According to Mutula (n.d.), the development of local content is hampered by the lack of local languages taught or used in colleges and schools, imported curriculums that reflect little local content, and the fact that information users resort to content generated from abroad. With African governments now realizing that capital is flowing out of their countries with the acquisition of foreign products and services, special libraries have a golden opportunity to produce or publish local content generated by their organizations and disseminate it using digital technology for wider use amongst African users.

Designing demand driven information systems

According to Mchombu (2007), the collections in most information centres reflect the subject profiles of the information collection developers, and are thus not based on real needs and demands. He advocates that through the utilization of user studies, information systems can be designed that are demand driven and accurately reflect what information is required. Hence, special librarians need to offer services tailor-made to suit the needs of management, clientele and library staff. This would entail a redefinition of their library roles by developing proactive strategies that would create new value in the organization and allow it to remain relevant and ahead of its competition (Nicholas, 2007).

Information Technology

Affordable information technology and the capacity to use it remains a problem. The lack of affordable access to the Internet poses a severe threat to special librarians as it is the backbone of efficient service delivery and reaching clients whenever and wherever they need information. Clients using special libraries measure service delivery and the relevance of information according to the technology used to provide the information. Technology thus defines the "success" of a special library (Muller 2007).

Marketing of services

Several corporate libraries have been downsized, closed or outsourced in recent years due to a lack of funding or managerial support, which tends to be justified by comparisons between the running costs of the library service and "free" information services offered via the Internet. (Muller, 2007). It has become vital for special librarians to market their services as managers of knowledge and information, which are the critical success factors of any organization.
Electronic communication channels can be utilized to communicate the value and content of their libraries to their clientele. Other than marketing their services, librarians also need to market their personal skills and expertise as valued assets to their organizations.

Conclusion

Special libraries in Africa face more challenges in demonstrating their relevance and value to their parent organizations than their counterparts in developed countries. Technologies offer many possibilities, but their successful implementation is in the hands of the government of each country and in the support of each library's organizational management. Proactive and valued service delivery and aggressive marketing by the librarians, highlighting their

expertise, and extending the range of services offered by special libraries should ensure that special libraries continue to exist within their parent organizations.

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A Bibliometric Analysis of Malaria Research in South Africa   by Using Sabinet Databases From 1991 – 2005

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Abstract

This study was conducted with the primary aim of providing bibliometric analysis of malaria research on SABINET databases from 1991-2005. Databases selected were UCTD, ISAP, and SA ePublications. It was aimed at assisting researchers under the subject of malaria to know what has and has not been researched under the subject and from that knowledge educates the nation more about it. Quantitative research design was used as well as content analysis. The study covered three SABINET databases, namely, UCTD, ISAP, and SA ePublications, targeting publications published between 1991 and 2005. The records in these databases were analyzed by nature of authorship, document and publication type, language of the document, document and author affiliation, databases, and quantity of publications. A total of 164 records on the subject of malaria was downloaded and analysed. Most of the records appeared in English language and in 1999 (21 records). Noted that publication in the domain has an up and down trend over the years. This a preliminary study therefore further study will still be required to provide reliable data for determining the nature and trend of malaria research in the country.

Key Words: Bibliometrics; Malaria; SABINET Databases; South Africa

1. Introduction and Background

This study focuses on the bibliometric analysis of publications on malaria research in three SABINET Databases from 1991 – 2005. Bibliometrics is a major sub-discipline in the quantitave research method. Wallace in Onyancha (2002: 45) defines bibliometrics as the "application of quantitative methods to the study of information sources". Malaria, according to Smith (2003) is an infectious disease transmitted by the bites of mosquitoes infected with the malaria-causing parasite. After being bitten by an infected mosquito, the parasite infects the human liver and red blood cells. This occurs most frequently in tropical Africa, parts of Asia, Central America, and South America. It occurs less in Greece, Turkey, and the Middle East. Poor sanitation in some of these countries contributes to the severity of malaria providing ideal conditions for mosquitoes to breed. In the United States, most malaria cases occur in people who have traveled in areas where malaria is present and in immigrants from those areas.

2. Problem Statement

According to Nchinda (1998: 398), a recent upsurge of malaria in epidemic-disease areas with explosive epidemics in many parts of Africa is probably caused by many factors, including

rapidly spreading resistance to antimalarial drugs, climate changes, and population movements. In Africa, malaria is caused by Plasmodium falciparum and is transmitted by Anopheles gambiae complex. Nchinda further states that in the last decade, the prevalence of malaria has been escalating at an alarming rate, especially in Africa. An estimated 300 to 500 million cases each year cause 1.5 to 2.7 million deaths, more than 90% in children under 5 years of age in Africa. Malaria has been estimated to cause 2.3% of global disease and 9% of disease in Africa; it ranks third among infectious disease threats in Africa after pnemococcal acute respiratory infections (3.5%) and tuberculosis (TB) (2.8%). Cases in Africa account approximately 90% of malaria cases in the world. Between 1994 and 1996, malaria epidemics in 14 countries of Sub-Saharan Africa caused unacceptably high number of deaths, many in areas previously free of the disease. Nchinda continues to state that adolescent and young adults are now dying of severe forms of the disease.

This study was seen as an aid to assist other researchers of the subject of malaria because the researcher conducted and arranged its results in the manner that it serves as a reference point to them, should they wish to conduct a similar study. It was also seen as a tool to assist educators in knowing what literature is available on the subject that they can utilize for teaching purposes.

The aim of the study was to determine the publication patterns and growth of malaria publications as indexed in three SABINET Databases between 1991 and 2005 in order to develop strategies for malaria management. The aim was achieved by the following objectives;

- To determine malaria literature
- To determine the nature of authorship on malaria
- To determine the language used to publish malaria literature
- To determine the publication or document type of malaria research
- To identify research and publication affiliation by country and institution
- To establish the domain/subject coverage of malaria research
- To determine the trend of malaria research

4. Literature Review

A literature review, according to Neuman (2003: 96), is based on the assumption that knowledge accumulates and that we learn from and build on what others have done. There are mainly four goals of a literature review;

- To demonstrate a familiarity with a body of knowledge and establish credibility
- To show the path of prior research and hoe a current project is linked to it
- To integrate and summarize what was known in an area
- To learn from others and stimulate new ideas

Neuman further describes six types of reviews;

- Self-study reviews – increase a reader's confidence
- Content reviews – place a specific project in the big picture
- Historical reviews – trace the development of an issue over time
- Theoretical reviews – compares how different theories address an issue
- Integrative reviews – summarize what is known at a point in time
- Methodology reviews – point out how methodology varies by study

4.1. Malaria

According to the Milton S. Hershey Medical Center College of Medicine website, malaria is a serious, parasitic infection that is spread by the bite of certain mosquitoes. A parasite is an organism that survives by living inside a larger organism, called a host. Malaria causes about 350-500 million infections with humans and approximately 1.3-3 million deaths annually, mainly in the tropics. Sub-Saharan Africa accounts for 85-90% of these fatalities. It is further stated that the death rate is expected to double in the next 20 years. The exact statistics are unknown because many cases occur in rural areas where people do not have access to hospitals and/or the means to afford the health care.

Causes of Malaria

The Milton S. Hershey Medical Center College of Medicine website states that malaria is spread in three ways. The most common is by the bite of an infected female Anopheles mosquito. However, malaria can also be spread through the transmission of blood or by sharing a needle with an infected person. There are four different species of parasites that cause malaria. They are the Plasmodium (P) falciparum (which is the most fatal), P. Vivax, P. Malariae, and P.Ovale. When an infected mosquito bites a person, the parasites enter the bloodstream and travel into the liver. They multiply in the liver, and then travel back into the blood, where they continue to grow and multiply so quickly that they clog blood vessels and rapture blood cells. When the red blood cells burst, the parasites are released and then attack other red blood cells. Malaria is not contagious, which means that one person cannot pass it directly to another.

Symptoms of malaria

According to the online encyclopedia, Wikipedia (2006), it takes anywhere from eight days to several months for the parasite to multiply into the liver, then enter the bloodstream. The most dangerous parasite, the P. falciparum, usually takes between 8 to 12 days. While the parasites are in the liver, the person does not feel sick. However, once they enter the blood stream, symptoms begin. Symptoms include;
- Fever
- Shivering
- Arthraglia (joint pain)
- Vomiting
- Anaema

Consequences of malaria

According to the online encyclopedia, Wikipedia (2006), consequences of infection with malaria include coma and death if untreated – young children and pregnant women are especially vulnerable. Splenomegaly (enlarged spleen), severe headache, cerebral ischemia and hemoglobinuria with failure may occur.

4.2. Bibliometrics

Msimango in Mthethwa (2005) stated that the word bibliometric first appeared in print in 1969 in Alan Pichard's article. It is mentioned that Ala Pichard used the word bibliometric to replace the word bibliography because he said that it was clumsy, not very descriptive, and could be confused with statistics itself or bibliographies on statistical methods to books and other media of communication, which is why he substituted it for statistical bibliography.

4.2.1. Empirical Laws of Bibliometrics

Inkpaahidi in Onyancha (2002) describes bibliometrics laws as statistical expressions which seek to describe the working of science by mathematical means. Bibliometrics has three main laws;
- Lokta's Law of scientific productivity
- Zipf's Law of word occurrence
- Bradford's Law of scattering

Lotka's Law

Lotka's Law of author productivity was formulated by Alfred J Lokta in 1926. This law stipulates that in any given field, the proportion of authors making a contribution of one article or publication each out of the total number of publications is 60%. Inkpaahidi in Onyancha, 2002).

Lotka observes that;
"*for any body of literature, there will be substantial number of authors who have each contributed only one publication, a smaller number of authors who have each contributed a small number of publications, and a very small group of authors who have each contributed a substantial number of publications.*"
(Wallace in Onyancha, 2002).

Bradford's Law

Bookstein in Onyancha (2002), states that Bradford's law, which is known as Bradford's Law of Scattering or Dispersion, is perhaps the most commonly used bibliometric law. This law was formulated by Samuel C. Bradford in 1934 while examining literature on geophysics and lubrication. While conducting this study, Bradford observed that;

"*if scientific journals are arranged in order of decreasing productivity of articles on a given subject, they may be divided into nucleus of periodicals more particularly devoted to the subject and several groups containing the same number of articles as the nucleus.*"

Zipf's Law

This law was formulated by George K. Zapf in 1933. It is based on the fact that people tend to use a bit of their available vocabulary for most communication and rely on the occurrence in a long text (Wallace in Onyancha, 2002).

5. Research Methodology

According to Saravanel (1991), research is a search for knowledge, which is aimed at discovering answers to problems through the application of scientific methods to the knowledge of the universe. According to Neuman (2003: 29), the purpose of conducting a research project includes the following;

- **Exploratory**

  o   to become familiar with the basic fats, setting, and concern
  o   to generate new ideas, conjectures, or hypotheses
  o   develop techniques for measuring and locating future data

- **Descriptive**

  o   to locate new data that contradicts the past
  o   to clarify a sequence of steps
  o   to report on the background or context of a situation

- Explanatory
  o   to test a theory's predictions or principle
  o   to extend a theory to new issues or topics
  o   to determine which of several explanations is best

According to Neuman (2003:35), every researcher collects data using one or more techniques. When conducting a study, a researcher must choose which research method will best suit the study. There are two basic methods of conducting a research; *qualitative and quantitative research approaches.*

These research approaches differ in many ways. They can best be differiented under the following aspects; purpose, process, data collection, data analysis, and reporting of findings.

For this study, the researcher chose to use the quantitative research method because it is a research method used in bibliometric studies as in this study; it also includes content analysis of available literature on the subject of malaria under three SABINET Databases (UCTD, ISAP, SA ePublications). According to Neuman (2003:36), content analysis is a technique for examining information, or content, in written or symbolic material.

For this study, three SABINET Databases were selected, namely, UCTD, ISAP, and SA ePublications.

Databases
- UCTD

This database was chosen because it contains bibliometric records of theses and dissertations at masters and doctorate level submitted to universities in South Africa. Honary doctorates are also included.

- SA ePublications

The most comprehensive, searchable collection of full-text electronic South African journals in the world, it focuses on making journals published in South Africa available online.

- **ISAP**

This database covers indexed articles from more than 900 South African periodicals. Specialist periodicals are indexed fully, whereas general and popular periodicals are indexed selectively.

Target Population

Neuman (2003), defines the population of a study as a large pool cases, or elements, which can be persons, group of people, organizations, written documents, or symbolic messages, that term, universe, is sometimes used interchangeably with population, as referring to the pool of cases that the researcher wants to study.

For this study, the target population was drawn from three SABINET Databases, which are, ISAP, UCTD, and SA ePublications. Literature on malaria published in South Africa between the years, 1991 and 2005, inclusive, as a reflected in the three databases was reviewed and analyzed.

Content analysis, according to Neuman (2003:310) is a technique for gathering and analyzing the content of text. The content refers to words, meaning, pictures, symbols, ideas, themes, or any other message that can be communicated. It includes books, newspaper or magazine articles, advertisements, speeches, official documents, films or video tapes, musical lyrics, photographs, articles of clothing, or works of art.

In content analysis, a researcher uses objective and systematic counting and recording procedure to produce a quantitative description of the symbolic content in the text.

To retrieval the data from the three SABINET Databases, the researcher used certain keywords to search for the information needed to conduct the study. Keywords such as "Malaria literature in South Africa" were used because the study was to determine the malaria literature in South Africa. At receiving lists of malaria research in South Africa, the results were then narrowed down to the time period between 1991 and 2005. These keywords were used in all three databases from which the information was then downloaded and analyzed in terms of language domain, nature of authorship, language of publication, publication or document type, subject coverage, and trend analysis.

6. Data   Analysis and Presentation

In this chapter, data retrieved from various databases was analyzed by the researcher. The various data was analyzed and presented so that it would respond to the aims and objectives of the study as set by the researcher.

6.1. Malaria literature

Malaria literature was examined in three SABINET Databases; UCTD, ISAP, and SA ePublications between the years 1991 and 2005. The researcher determined that malaria literature was published inconsistently over the given period, in some years; more literature was published when compared to other years. In total, there were 164 recorded publications on malaria during the period of 14 years. During the year 1999, the most malaria literature

was published (21 = 12.8%). Over the years, the number of articles were; 1991 (0 = 0%), 1992 (3 = 1.83%), 1993 (15 = 9.15%), 1994 (3 = 1.83%), 1995 (0 = 0%), 1996 (18 = 10.98%), 1998 (11 = 6.71%), 2000 (16 = 9.76%), 2001 (20 = 12.20%), 2003 (11 = 6.71%), 2004 (15 = 9.15%), and 2005 (3 = 1.83%).. The results are illustrated below;

Malaria Literature Published Between 1991 - 2005
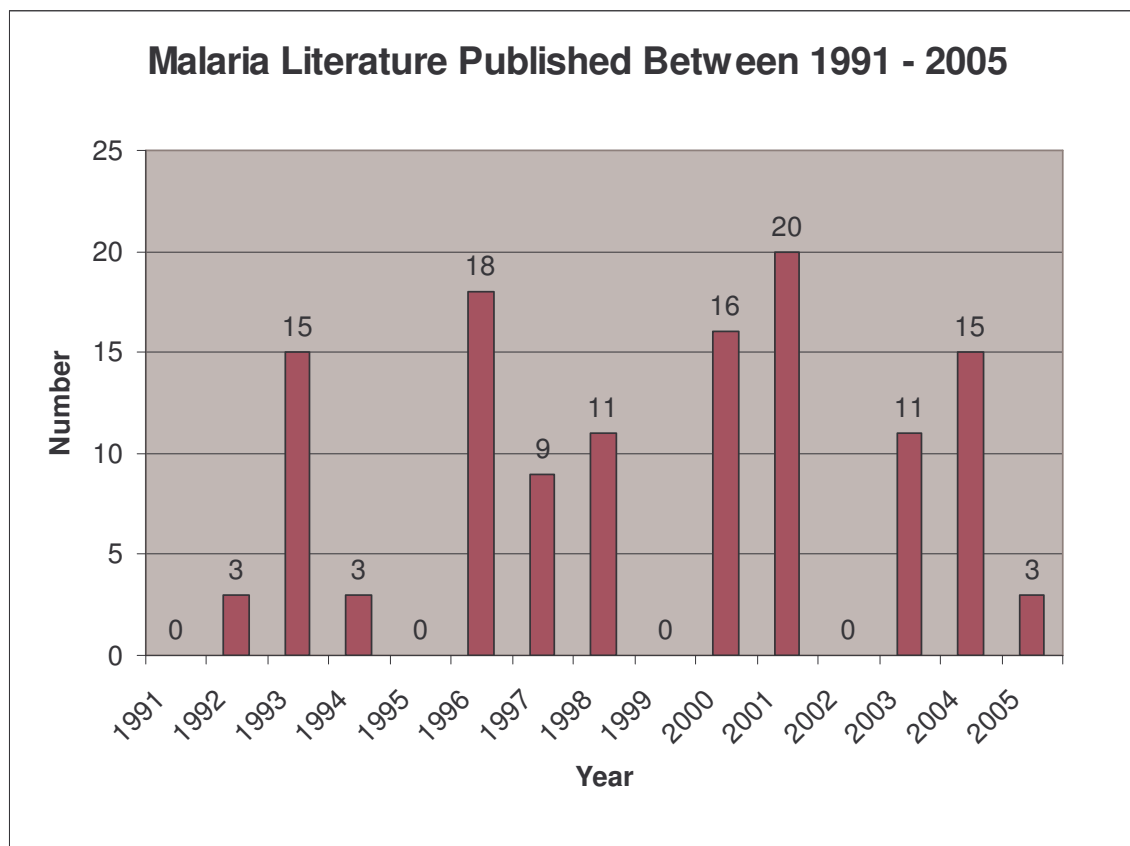
Fig.1: Malaria research recorded between 1991 - 2005

6.2. Nature of Authorship
In the study, the researcher gathered that out of the total of 164 records on malaria, more authors collaborated as opposed to single authoring, 83 (50.61%) records had authors that collaborated; followed by 44 (26.83%) single authors. 37 (22.56%) records had anonymous authors.

From these records, the researcher found that between the year 1991 and 1999, most authors chose to collaborate as opposed to single-authoring. From the year 2000 onwards, authors became more independent. It was apparent from these records that there was more single authoring from the year 2000.

Nature Of Authorship of Malaria Literature
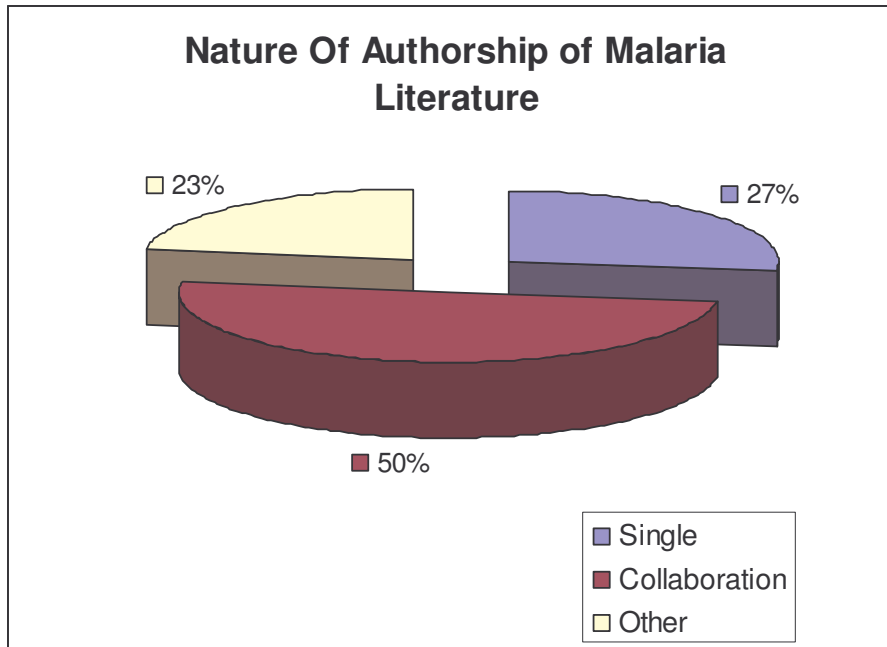
Fig.2 Pie Chart illustrating the Nature of authorship of malaria literature

6.3. Language of Publication

Out of a total of 164 records retrieved from the three databases, only two languages were used when compiling the various records. Languages used were English (155 = 94.51%), and the rest were published in Afrikaans (9 = 5.49%). This proved that English was the most popular language possibly because it is an International Language, and also perhaps because publishers require English-based manuscripts.
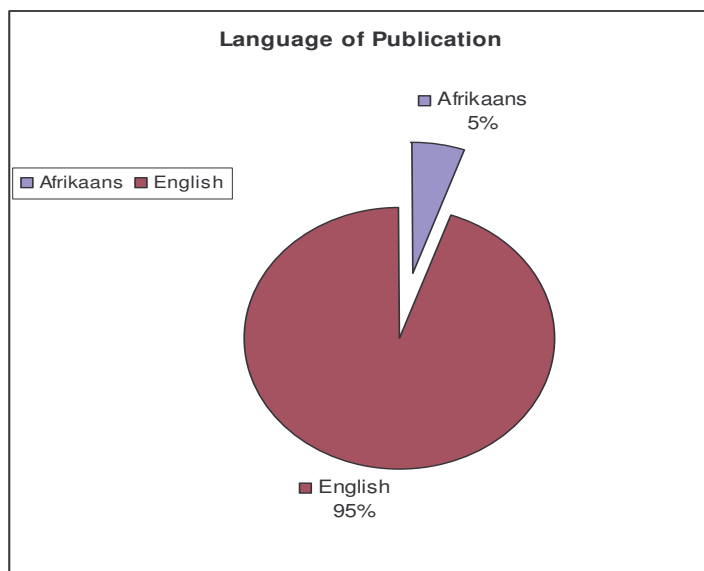
Fig.3 Pie Chart illustrating Language of publication

6.4. Publication or Document Type

Out of the total of 164 records retrieved from the three databases, there were three different types of documents. Periodicals (Other) ranked the highest number of records at 147 records (89.63%), which were followed by Journals, which were 11 (6.71%) and the least number of records were Theses which came to a total of 6 (3.66%).

Document Type	Number of Records	Percentage (%)
Periodicals (Other)	147	89.63
Journals	11	6.71
Theses	6	3.66
TOTAL	**164**	**100**

Table 1: A table illustrating the number of document types retrieved

6.5. Public Affiliation by Country and Institution

Records were also analyzed by country and institution to illustrate their affiliation. Between the time of the given 14 years (1991 – 2005), the researcher found that only one country was specified (South Africa), one institution (University of Natal), three provinces (Mpumalanga, Northern Province, and KwaZulu-Natal) and other unspecified locations. In the databases (all inclusive), all records were specified as published in South Africa (147 = 89.63%), Mpumalanga (4 = 2.44%), Northern Province (1 = 0.61%), University of Natal (1 = 0.61%), KwaZulu-Natal (1 = 0.61%), and other unspecified locations (10 = 6.10%).

These results are demonstrated below;

Country/Institution	Number of Publications	Percentage (%)
South Africa	147	89.63
Mpumalanga	4	2.44
Northern Province	1	0.61
University of Natal	1	0.61
KwaZulu-Natal	1	0.61
Other	10	6.10
TOTAL	**164**	**100.00**

*Table 2: Table illustrating public affiliation by country and institution*6.6.Subject coverage of malaria research
These records were also analyzed by subject coverage over the 14 year time period in order to demonstrate how malaria is being presented in South Africa and what subjects are being covered the most. When searching for malaria records in all three databases, the researcher found that childhood malaria was the most frequently used subject. This is possible because of all malaria deaths in Africa, 90% have been children, especially in the past five years. The second most covered subject on malaria was the effect of malaria on the South African economy, which was then followed by the treatment and prevention of malaria.

6.7. Malaria Trend Analysis
From the study, the researcher found that during the given time period (1991 – 2005), malaria research has never been constant. Over some years, a lot of research was done and more records were published and then again, during some years, little or research was done.
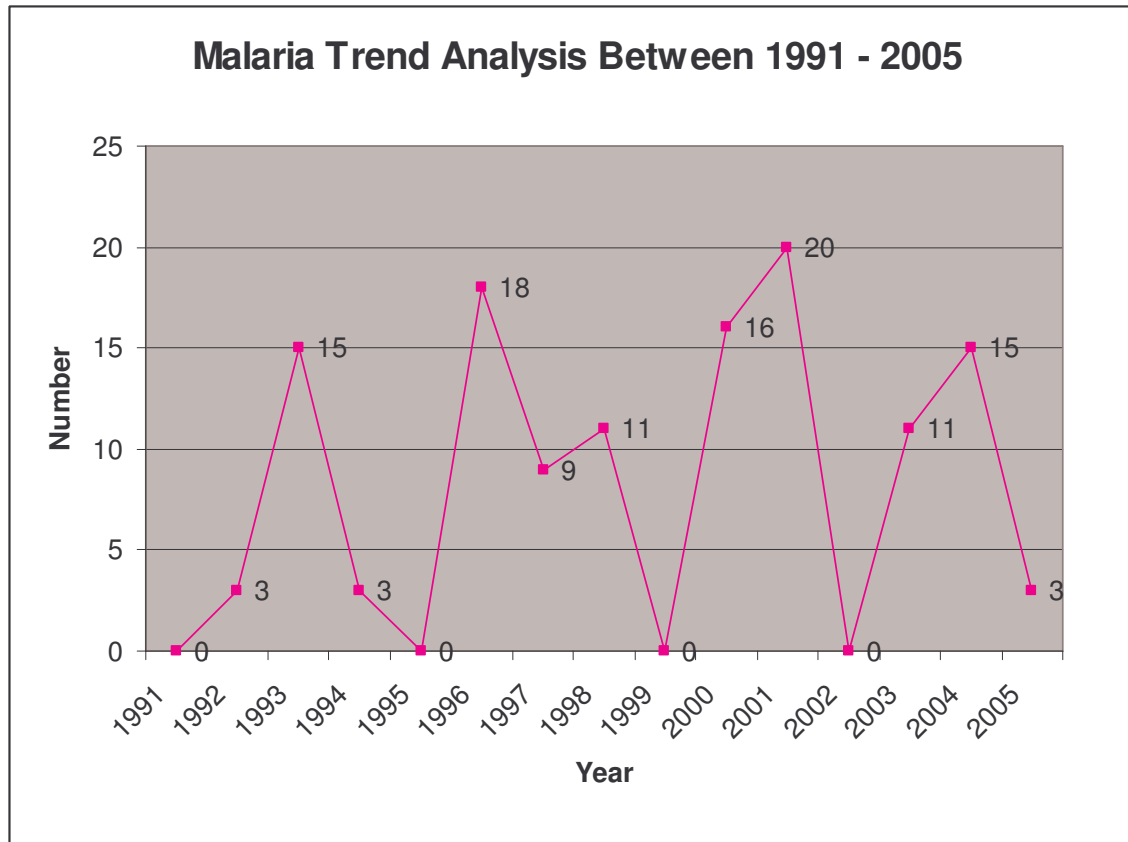
Fig. 4: Graph illustrating malaria trend analysis between 1991 and 2005

7. Conclusions

It was gathered that in three examined databases, there were (in total) 164 records. Most of these records were published in the year 1999 (21 = 12.8%). Out of the total of 164 records retrieved, a large number of records were found to have been published by collaborated authors (83 = 50.61%), when compared to single authors (26.83%), and unknown authors (22.56%). When examining the language domain used to publish malaria research, English was found be the dominant language as compared to Afrikaans, which is the other language that was used. These records published as other periodicals, journals and theses. One of the objectives that the researcher had set was to determine the public affiliation by country and institution. The records were found to be published in South Africa, it being the research area. Institutions included; Mpumalanga, Northern Province, University of Natal, KwaZulu-Natal, and other unspecified institutions.

The subject coverage of malaria literature that was most dominant was childhood malaria. This could have been because 90% of all malaria deaths in Africa have been constant, the researcher found that over some years, much research was conducted and published, when over some years, little or no research was done at all.

When compared to other bibliometric studies, such as Tuberculosis (Mthethwa – 2005), research on malaria has been proven to be too little. This goes to show that malaria is not

taken as seriously as other diseases are, when in-fact it is as fatal as the rest of them, causing an estimated 300 to 500 million cases each year and cause 1.5 to 2.7 million deaths, more than 90% in children under 5 years of age in Africa.

It is recommended that:

- There is a necessity for more malaria research to be conducted in all parts of South Africa.
- More authors need to be established in-order to increase the number of literature in the country, because from this study, the researcher realized that only 164 records available on three databases. Mthethwa (2005) found 1095 records on Tuberculosis in four databases. This shows that Tuberculosis is given more attention as compared to malaria.
- Malaria awareness campaigns need to be put into action to educate the nation on how they can prevent the disease and treat it.
- It was gathered that most published literature was in the English language which is only one of the eleven official languages of South Africa. There were no records published in any other African language. Not every citizen of South Africa is English literate (especially those that reside in the rural areas), which is probably why the nation is not educated as it should be about the disease.

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The Rhallenges and Opportunities of Teaching and Learning ICT Related Courses at the University of Zululand. A Work in Progress.

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Introduction

The term Information Communication Technology (ICT) or its plural derivative ICTs represents a relative new concept that means different things to different people depending on which side of the technical and subject divide you find yourself. In the realm of education, whether secondary or higher education, the term is generally understood to mean technology and in particular, computer technology, used as a tool to communication information. Before the event of the World Wide Web (WWW) in the late 1970's early 1980's information communication was done primarily in an 'audio-visual' fashion such as television and film. In addition information was communicated either via sound or visual media such as microfilm, Microfiche etc. In other words, sound and video in all its different formats together with books, newspapers and TV were the main instruments of information communication until the event of the computer.

In the field of education, **Audio-visual education** emerged as a discipline in the 1920s. Film technology developing rapidly and a **visual instruction** movement arose, that actively encouraged the use of visual materials to make abstract ideas more concrete. As sound/audio technology improved, the movement became collectively known as '**audio-visual instruction**'. In the 1950s and 60s developments in the educational process caused the field of audio-visuals to shift its emphasis from devices to an examination of the teaching and learning process. It was generally accepted that learning is accelerated when information is delivered and received simultaneously via more than one **modality,** in this case, vision and hearing. One of the direct outcomes of this shift in emphasis was the research done by the American psychologist B. F. Skinner. Under Skinner the emphasis in education shifted from the presentation of information toward the learner's behaviour and the reinforcement of that behaviour.

The next major change in the development of teaching and leaning and the processes it represents came in the early 1980's when the development of affordable computer technology and the internet together with World Wide Web (WWW) began to change communication. E-mail became a popular and cheap medium of mass communication. Similarly, the development of multi-media applications by Apple and Microsoft and the introduction of the modern cellular phone technology in the late 1980's forever changed the way in which we communicate with each other.

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In Britain an ICT teaching and leaning strategy for schools was developed in 1981 through the government-funded Micro-electronics Education Programme. This was followed by the Micro-electronics Education Support Unit, which in 1988 merged with the Council for Educational Technology to become the **National Council for Educational Technology (NCET)**. The aim and objective of the NCET was to evaluating and promote the use of new technologies in education and training.

In the same year that it founded the **NCET,** the British government set up the **Information Technology in Schools (ITIS)** initiative to oversee expenditure in this area. Initial strategy focused on encouraging teacher training in new technologies and the provision of hardware in schools through the payment of Education Support Grants **(ESGs)** to local education authorities **(LEAs).**

Between 1991 and 1995 some £12 million of government funding, through NCET, has been made available for the purchase of CD-ROM systems by schools. Support has also been given to the development of materials published on CD-ROM for Key Stages 3 and 4 of the National Curriculum.

South Africa does not have a similar nationally coordinated multi-media learning system for pre-tertiary teaching and leaning in place. At the time that Britain was introducing these new developments in ICT teaching and learning, South Africa was busy transforming itself into a democratic society. The introduction and development of ICTs in teaching and learning was certainly not on the agenda of the education department despite the fact that it sourced most of its new ideas for the transformation of education in South Africa from the Australian and New Zealand governments.

1. **ICTs and the development of ICT based teaching and learning at the University of Zululand (UNIZUL).**
To evaluate the use of ICTs at the University of Zululand one needs to briefly compare developments here against developments elsewhere.

Starting with the United Kingdom all the country's universities (about 60) are connected to the Internet via a high-speed academic network known as **JANET** that enables high-quality moving video to be networked for remote teaching and research purposes. In Australia a similar organisation called the Education Network of Australia (EDNA) supports and promotes the benefits of technology for education and training. EDNA which has been operating since 1996 is a joint initiative of the Australian Government and the territory governments through their education departments, to provide free news, resources, networks and online tools for educators.

In South Africa internet access to the country's 23 main tertiary institutions is provided via the Tertiary Education Network **(TENET),** a Section 21 organisation founded jointly by the then Committee of Technicon Principals (CTP) and the then South African Universities Vice –Chancellor's Association(SAUVCA) in August 2000. The two bodies have since merged into what became known as "Higher Education South Africa" **(HESA).** The main purpose of TENET is to secure, for the benefit of South African universities, internet and information technology services. [8]

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[8] Tertiary Education Network: Acceptable Use policy for GEN2 services, Version 2.0. 7January 2005. pdf.

According to TENET's 2005 annual report[9] of the country's 23 higher education institutions seven, namely, Cape Town, KZN, Stellenbosch, Johannesburg (former RAU),Tshwane University of Technology, WITS and Pretoria University together account for more than 51% of the total higher education internet access. See graph below.
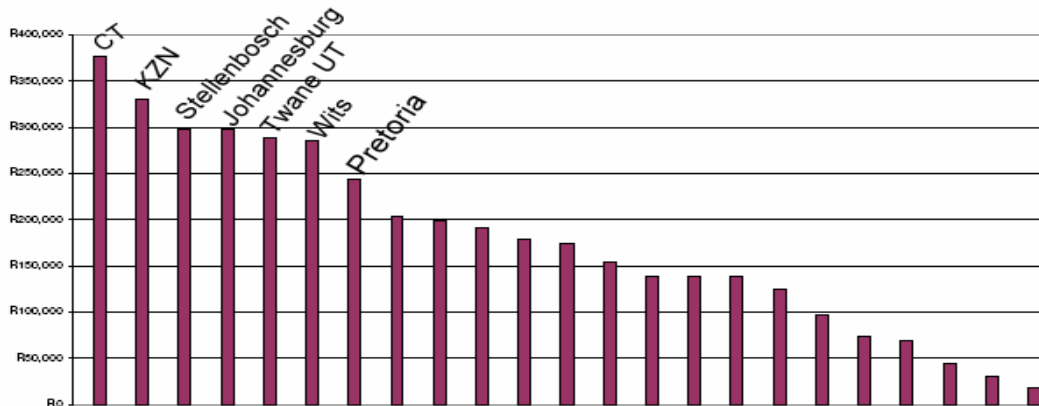
Below is the internet connection speeds (bandwidth) of the different tertiary institutions in South Africa as of 2007. The universities indicated in the above graph are highlighted in light green below. The University of Zululand is indicated in yellow. It has among the lowest bandwidth of all the institutions. It is substantially lower than similar institutions such as Walter Sisulu University (indicated in orange) in the former Transkei. Walter Sisulu University has 7,049 kbps bandwidth compared to the University of Zululand's paltry 1,928 kbps. This is about three times more than the University of Zululand.   Similarly, the Tshwane University of Technology has a combined bandwidth of 16,768 kbps which is eight times more than Unizul.
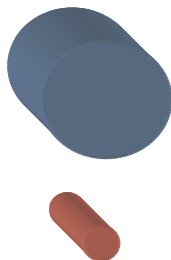
Tshwane University of Technology

University of Zululand (Unizul)

Circuit	CIR[10] Kbps	Cu In %	Cur Out %	Ave In %	Ave Out %	Max In %	Max Out %
University of Cape Town - Main Campus: Backbone IPNet	27,840	78	34	66	33	98	75

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[9] TENET Annual Report. 1 January 2005-December 2005, July 2006.

[10] Short for *committed information rate,* a specified amount of guaranteed bandwidth (measured in bits per second) on a Frame Relay service. Typically, when purchasing a Frame Relay service, a company can specify the CIR level they wish. The Frame Relay network vendor guarantees that frames not exceeding this level will be delivered. It's possible that additional traffic may also be delivered, but it's not guaranteed. Some Frame Relay vendors offer inexpensive services with a CIR equal to zero. This essentially means that the network will deliver as many frames as it can, but it doesn't *guarantee* any bandwidth level.
(http://www.webopedia.com/TERM/C/CIR.html)

University of the Witwatersrand - Main Campus: Backbone IPNet	23,952	37	15	44	15	74	47
University of Stellenbosch - Main Campus: Backbone IPNet	20,504	81	32	69	34	97	56
North West University: PUK campuses - Main Campus: Backbone IPNet	17,584	37	6	66	13	101	46
University of Pretoria - Main Campus: Backbone IPNet	15,696	58	48	65	49	99	94
University of South Africa - Main Campus: Backbone IPNet	15,416	5	10	37	22	99	66
University of KwaZulu-Natal - Durban Campus: Backbone IPNet	15,216	80	38	70	37	103	86
Rhodes University - Main Campus: Backbone IPNet	12,224	70	22	64	22	114	45
Cape Peninsula University of Technology: Cape Town campus - Main Campus (Dixtrict Six): Backbone IPNet	12,208	17	4	18	5	54	14
University of the Western Cape - Main Campus: Backbone IPNet	11,656	35	9	43	16	93	88
University of Johannesburg - Auckland Park: Backbone IPNet	11,184	46	15	38	25	93	63
University of the Free State - Main Campus: Backbone IPNet	10,016	59	15	62	19	99	76
Tshwane University of Technology: TP campuses - Pretoria Campus: Backbone IPNet	7,912	64	20	68	23	108	88
Cape Peninsula University of Technology: Bellville campus - Main Campus: Backbone IPNet	6,904	23	10	27	11	95	28
University of Limpopo: Turfloop Campus - Main Campus: Backbone IPNet	6,880	39	4	44	5	97	44
University of Limpopo: Medunsa campus - Main Campus: Backbone IPNet	5,984	43	8	48	9	110	116
Vaal University of Technology - Main Campus: Backbone IPNet	5,616	12	3	56	6	106	33
Durban University of Technology - Steve Biko Campus: Backbone IPNet	5,544	61	9	53	7	102	27
Central University of Technology, Free State - Main Campus: Backbone IPNet	4,896	1	14	34	7	102	58
University of Fort Hare - Alice Campus: Backbone IPNet	4,392	45	6	63	9	115	21
University of KwaZulu-Natal - Pietermaritzburg Campus: Backbone IPNet	3,744	79	42	71	23	102	64
Nelson Mandela Metropolitan University - South Campus: Backbone IPNet	3,704	45	9	46	16	96	57
Tshwane University of Technology: Soshanguve Campus - Main Campus, Soshanguve: Backbone	3,352	73	3	38	4	104	20

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IPNet							
Nelson Mandela Metropolitan University - North Campus: Backbone IPNet	3,244	90	21	80	24	107	58
University of Venda for Science & Technology - Main Campus: Backbone IPNet	3,240	30	38	41	12	94	48
University of Johannesburg - Doornfontein (DFC): Backbone IPNet	2,848	3	4	36	7	104	22
North West University: Mafikeng campus - Mmabatho Campus: Backbone IPNet	2,520	0	0	33	4	100	19
University of KwaZulu-Natal - Premium service at Durban: Backbone IPNet	2,512	23	10	33	13	100	30
Durban University of Technology - ML Sultan: Backbone IPNet	2,488	72	5	40	6	94	36
Walter Sisulu University: Border Technikon Campus - College Street Campus: Backbone IPNet	2,424	96	39	45	17	116	116
University of South Africa - Florida Campus: Backbone IPNet	2,336	52	2	36	10	168	105
Walter Sisulu University: Eastern Cape Tech Campus - Main Campus, Butterworth: Backbone IPNet	2,304	13	3	32	5	93	21
University of Johannesburg - Auckland Park Bunting: Backbone IPNet	2,048	0	0	22	3	94	26
Walter Sisulu University: Univ of Transkei Campus - Main Campus: Backbone IPNet	1,984	17	40	32	21	74	67
University of Zululand - Main Campus, kwaDlangezwa: Backbone IPNet	1,928	47	7	51	6	101	25
Walter Sisulu University: Eastern Cape Tech Campus - Chiselhurst Campus: Backbone IPNet	1,536	0	0	27	2	98	33
Tshwane University of Technology: TP campuses - Nelspruit Campus: Backbone IPNet	1,280	0	0	15	3	98	20
Durban University of Technology - Riverside Campus: Backbone IPNet	1,032	9	1	31	5	97	16
National University of Lesotho - Main Campus: Backbone IPNet	1,024	96	7	37	6	98	80
University of KwaZulu-Natal - Africa Centre - Somkhele: Backbone IPNet	1,024	74	2	38	4	96	67
Mangosuthu Technikon - Umlazi: Backbone IPNet	1,024	1	1	34	7	98	33
Tshwane University of Technology: TP campuses - Witbank Campus: Backbone IPNet	960	1	1	13	2	97	31
Tshwane University of Technology: Ga-Rankuwa Campus - Main Campus: Backbone IPNet	928	0	0	10	1	87	5
Tshwane University of Technology: Ga-Rankuwa Campus - ERC Garankuwa: Backbone IPNet	928	0	0	31	4	103	27

University of Fort Hare - East London Campus: Backbone IPNet	808	6	0	59	11	110	57
University of Fort Hare - Bisho Campus: Backbone IPNet	792	1	1	9	3	83	49
Tshwane University of Technology: TP campuses - Polokwane Campus: Backbone IPNet	784	2	1	15	4	104	45
Tshwane University of Technology: TP campuses - Library, Pretoria Campus: Backbone IPNet	680	0	0	10	1	92	5
University of Stellenbosch - African Institute for Mathematical Sciences: Backbone IPNet	560	111	24	55	18	112	60
Tshwane University of Technology: TP campuses - Pretoria Campus ERC B20: Backbone IPNet	552	70	2	45	6	112	29
Tshwane University of Technology: TP campuses - Pretoria Campus ERC B44: Backbone IPNet	552	22	73	48	19	110	93
Nelson Mandela Metropolitan University - South Campus Library: Backbone IPNet	520	0	0	7	1	78	5
Tshwane University of Technology: TP campuses - Arcadia Internet Laboratory: Backbone IPNet	320	59	87	38	11	98	87
University of Swaziland - Main Campus: Backbone IPNet	320	17	4	36	7	98	65
University of the Witwatersrand - Agincourt Health and Population Unit: Backbone IPNet	280	0	0	9	1	74	27
Rhodes University - Gauteng Liason Office: Backbone IPNet	256	1	2	4	4	38	31
Tshwane University of Technology: TP campuses - Polokwane Campus Internet Laboratory: Backbone IPNet	192	1	1	17	2	98	9
Tshwane University of Technology: TP campuses - Arts Campus Internet Laboratory: Backbone IPNet	192	1	0	39	8	98	31
Tshwane University of Technology: TP campuses - Nelspruit Campus Internet Laboratory: Backbone IPNet	192	1	1	29	3	99	14
Tshwane University of Technology: TP campuses - Witbank Internet Laboratory: Backbone IPNet	192	0	0	33	4	98	38

Without sufficient bandwidth the internet as a teaching and learning tool becomes meaningless. Student access to the internet at the University of Zululand, which is shared in the computer labs by lecturers, is currently so slow that no meaningful teaching and learning can be done online. Connecting to a specific web-site or attempting to illustrate how to select and download a basic program, such as the latest versions of PHP or MySQL for instance, becomes near impossible as it takes for ever to connect to and download from these sites.

Faced with these problems lecturers who wish to use ICTs in teaching and learning have to become very skilful and creative. One way to overcome this problem is to set up specific intranets to server the needs of students. Unlike other tertiary institutions (such as the

Universities of Cape Town, Pretoria, Wits. Free State and Stellenbosch), not to mention overseas institutions such as the University of Sydney, the University of Zululand has no officially sanction teaching and learning strategy in place to provide ICT teaching and learning to staff and students.

Staff who makes use of ICTs in their teaching has to do so on their own using technologies familiar to them. Although an ICT teaching and learning platform such as WebCt has being used in Commerce and some Science departments in the past it is not neither neither officially promoted nor officially maintained on campus. Where and when used it is done through the initiative and efforts of individual lecturers. The upshot has been that in the absence of an officially supported and maintained ICT teaching and learning strategy, diverse technologies and systems have been employed by staff in their attempts to develop e-learning initiatives. These web-based systems, currently ranges from Windows based WebCT to Open Source **Content** Management (CMS) and **Course** Management Systems (CMS) such as Joomla and Moodle which are experimented with and maintained by individual staff members. Some of these web based systems are run off departmental servers while others are run of ICT servers.

A good example of the official use of ICTs in teaching and learning is at the University of Sydney. An operational plan for ICT in teaching and learning was adopted in 2004 with the aim of improving the quality of the teaching and learning experience through ICTs and to remove any fragmentation and duplication of services through coordination and planning. WebCT was adopted as the platform for e-learning and video-conferencing. The entire process known as the **Learning and Management System (LMS)** is managed by a specialised team whose main task is to manage the system and to train and assist staff and students and to prevent any duplication of core services. In addition strict quality assurance principles are applied to all levels of the service.

The University of Zululand is clearly very far removed from such an e-learning system. The current 1.928 kbps pipeline needs to be doubled to at least 4Mbps if it is to meet the challenges faced by modern tertiary institutions today. The development of the new Richards Bay campus and the addition of this facility to our already limited bandwidth will only aggravate the problem. There are no plans afoot to increase the current bandwidth. Management has so far baulked at the increased cost of upgrading the bandwidth. In the mean time the university slips further and further behind in its ability to develop and deliver course content via e-learning. In 2005 the university as part of its endeavour to restructure itself as a comprehensive institution adopted the slogan "restructured for relevance". Unless Management shifts its thinking towards the official introduction and maintenance of ICTs in the development of teaching and learning at the university, as costly as it may be, the university stands a good chance of becoming irrelevant in the wider tertiary landscape.

Conclusion

As a comprehensive institution with career focused courses and training in mind the University of Zululand should put into place a comprehensive ICT program to prepare its students/learners for information driven labour marked. This is currently not happening and is to the detriment of the institution. The current web committee set up in 2007 appears to be tasked with the nature and content of the university website and the management of the site. It has no mandate to investigate or recommend the implementation of content or course management system for the entire campus as is the case at other institutions.

A careful Blend of General and Vocational Education: Is This Still Necessary in the Education And Training of the Modern LIS Professional?

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Abstract

In the context of a rapidly evolving discipline almost completely dominated by digital technology, this paper revisits the long-standing debate on the value of general education in higher education in which professional information and library science (ILS) education and training is located. In doing so, it reviews the literature to draw out the dominant discourses on general education as well as refers to findings on the subject in a recent study of library and information services (LIS) employers, employees and ILS educators in South Africa. The purpose of the paper is to examine whether general education is still necessary for the modern information context. The paper concludes that general education is as essential as vocational preparation for the current LIS work environment. It recommends that the modern ILS curriculum must capture a careful blend of general and vocational education.

Introduction

This paper begins by presenting library and information science as a rapidly evolving discipline. In this context, it revisits the debate on the value of general education in higher education and in information and library science (ILS) education and training in particular, to draw out the dominant discourses on the subject. It also draws from an empirical study conducted in South Africa that raised the issue of general education in ILS education and training in South Africa.   The purpose of the paper is to examine whether general education (defined later), which traditionally has been incorporated in some way into professional ILS education and training in most countries, is still necessary for the modern information context.

An evolving discipline

There has been much inconsistency in the use of terminology to refer to academic departments, professional associations and journal titles in our discipline. Sometimes both the words 'library' and 'information' are used, while other times, either one of these terms are incorporated. In more recent times, the latter has been the more popular choice. There has been debate in the literature as to what lies behind these various terms (International Federation of Library Associations and Institutions [IFLA], 2000; Martin, 1987; Stieg, 1992). Despite this ongoing debate, academic programs, departments or schools have gone on to change their names to include 'information studies' or 'information science' or 'information management' and more recently, 'knowledge management'. According to some commentators (Broadbent, 1985; Todd & Southon, 2001), while some of these changes may be seen as

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cosmetic and designed to assist with image problems associated with the discipline of library science, on the whole the changes in name do reflect a real shift in the orientation of academic staff, students and programs. Educators and institutions have been responding to the changing information and technological environment.

Information science emerged into the arena of library science in the 1960s. Library science educators could not ignore the fact that an entirely separate field of study was developing in a way that threatened the foundations of library science (Grotzinger, 1986, p. 459). Librarianship, before the revolutionary effects of information technology, had focused on developing physical collections of books and other materials in library buildings staffed by people who had been trained to select, acquire, organize, retrieve and circulate these materials. However, evolving information and communication technologies (ICTs) have revolutionized the services and management of libraries and information centres (Bawden, Vilar, & Zabukovec, 2005; Sengupta & Umarani, 1996; Tedd, 2003; Tredinnick, 2004). As a result of the revolutionary effects of information-handling technologies, library and information services have extended beyond "*physical collections and buildings to the virtual world of the Internet*" and the focus became information provision in a variety of contexts (IFLA, 2000, para. 1). According to Grotzinger (1986, p. 459) it was in this evolving context that "*independent degree programs in information science … began to cut into the available pool of students and to threaten the credibility and existence of library schools*". A number of library schools began to establish an information science track or sub-curricula within their basic professional programs. Crowley and Brace (1999, p. 77) point out that by the 1970s many of the schools of library science in the United States of America had begun to change their names to schools of library and information science. Martin (1987, p. 130) argued that this inclusion of information science into the basic professional library science programs was partly in response to the challenge of new information-handling technologies that had been evolving, and partly "*to provide a more satisfactory vehicle for studying the generation, use and transfer of information*". Information science represented "*a conscious attempt to introduce academic rigour and standardized research methodologies into an area which evolved on a largely ad hoc and pragmatic basis*" (Martin, 1987, p. 130). Wilson and Hermanson (1998, p. 487-488) reiterated this by arguing that for some time there had been an increasing call for an intellectual base in library science that could stand in its own right. There was a need to unify practice and theory, and many leaders in the field believed "*information science is what will bring the profession to full flower*".

The relationship between library science and information science has long been of interest to the professional and academic community as there has been much uncertainty about this relationship. Some believe library science and information science may be regarded as two separate disciplines with some common interest. Others believe that together, they may be viewed as forming a single whole. The former define librarianship as being devoted to the organization, preservation and use of human graphic records. Information science is defined as a field devoted to scientific inquiry and professional practice - addressing the problems of the effective communication of knowledge and knowledge records amongst humans in the context of social, institutional, and/or individual uses of and needs for information (Vakkari, 1994). With regard to the unifying concept, while there have been various arguments about what unifies library science and information science, a significant feature of this concept is that information science is not tied up with any particular information organization. Consequently, "*the transition from library science to information science has broadened the scope*" of the discipline of library science (Vakkari, 1994, p. 11). For example, there has been a broadening of the scope of librarianship to include in library and information studies not only libraries of many kinds, but also online retrieval services, archives, databases, records management and documentation of many kinds.

The literature also alerts us to the growing significance of the emerging information market. Cronin (1985, p. 11) pointed out in the 1980s, that there was a rapid growth in the number of information-related occupations and in the number of professionals filling these roles. At the time, Cronin also pointed out that while in the past library schools monopolized the education and training of professional information workers, this situation was changing fast. The growth in the number of information-related occupations and the parallel growth in information consciousness generally, have resulted in an increasing number of higher education institutions moving into the business of providing professional information-related education and training programs. These programs are variously designated 'information technology', 'informatics', 'information systems analysis and design' and various other such names, and represent an increase in the variety and sophistication of programs designed to produce a new wave of information specialists. One of the effects of the 'information revolution' has been to deregulate the training market and to create opportunities for expansion amongst institutions not traditionally associated with information training. Lor (1990, p. 70) also made reference to the notion that the "*growing acceptance of the strategic value of information and that the proportion of workers involved primarily in the handling of information is growing*". He also pointed out that this emerging information market is diverse and difficult to define as it "*cuts across conventional industries and sectors*". It is for this reason that Cronin (1985, p. 14) referred to it as the 'invisible marketplace'. It still is today, in fact even more so, especially with the entry of the elusive concept of knowledge management into the fray. Bruce (1999, p. 189-190), writing at the turn of the century, talks about information flow being global and how institutions and organisations are increasingly recognising that the "*creation, management and utilisation of company-wide information and knowledge are of strategic importance*". He makes the crucial point that in this environment where information is the key ingredient in many kinds of work, the individuals working with the creation, diffusion and utilisation of information do not necessarily regard themselves as information professionals belonging to a specific profession, even though they do concede that they need to learn how to work better with information. While this further emphasises the 'diffuse and difficult to define' nature of the emerging information market, according to Bruce (1999, p. 190), what needs to be identified and catered for by education and training programs are "*the essential competencies of a workforce equipped to function in learning organizations and knowledge-based businesses*".

Many writers (Bawden et al., 2005; Enser, 2002; Tedd, 2003; Todd & Southon, 2001) have alluded to the fact that no particular profession or field of study has a monopoly on job opportunities in the emerging information market. Although librarians and related information professionals such as archivists, records managers and documentalists can contribute valuable expertise and competencies to the emerging information market, they are not the only ones in the field. Since information technology, specifically computers and data communications, is extensively used in the organization, processing and dissemination of information (including Web-enabled information delivery), computer scientists are well placed to move into this field. Computer science departments have been developing programs in information systems and business data processing. Business schools have also developed programs in management information systems and information management. In fact Crowley and Brace (1999, p. 77) pointed out that information science as a profession will be engaged in competition "*not with library science, but with the business-related profession of management and information systems*".

The pervasiveness of information work has made it very diverse, with information and library science (ILS) graduates taking up positions beyond the traditional boundaries of libraries and information centres. The emerging information market in which these graduates are pursuing careers include database services, as entrepreneurs, in small information enterprises, in publishing and the book trade, and in information resource

management and knowledge management in government and industry (Brine & Feather, 2002; Todd & Southon, 2001). These markets place different demands on the goals and objectives of ILS education and training programs. While the emergence of the information and knowledge economy has created new opportunities for providers of ILS education and training, it has also presented some challenges in a highly competitive higher education environment. It has already been suggested that jobs in the emerging information market need not necessarily be filled by graduates of ILS programs. The emerging information market has been attracting recruits from outside traditional librarianship and information work.

Thus some of the challenges facing ILS programs are to decide to what extent to concentrate on the traditional library market, whether to be in competition with other 'non-traditional' providers and attempt to satisfy the demands of the emerging information market, or whether to attempt to meet the needs of both markets. There is no simple answer, especially in the context of the shifting and changing nature of the information landscape. Van House and Sutton (1996,
p. 145) warned "*that the field is changing: the boundaries, players, capital and rules of competition are all in flux*". Testimony to this is the more recent arrival of knowledge management, which is seen by some as a "*saviour of the beleaguered image of librarians*" and by others as "*offering substantial enhancement of the role of the information professional and an opportunity to rejuvenate the profession*" (Todd & Southon 2001, p. 315).
The debate revisited

It is evident that the ILS discipline is a rapidly evolving one that has been almost completely dominated by digital technology. Furthermore, its boundaries have become blurred as emerging information markets in a modern knowledge economy have resulted in multiple disciplines laying claim to the business of information and knowledge management. It is in this context that the long-standing debate on the value of general education in higher education, in which professional ILS education and training is located, is revisited.

Higher education has for many years been characterized by two competing philosophies, that is the liberal arts philosophy (also referred to in the literature as general education) and the vocational philosophy. General education or liberal arts education focuses on the individual's state of being educated. Subjects are studied not for the utility of their content for practical purposes, but rather for their capacities to train the mind and cultivate the intellect (Sanderson, 1993, p. 189). The famous liberal arts philosopher J.H. Newman expounded the virtues of general education in the book, *The idea of a university,* which was first published in 1873. A liberally educated mind has "*the capacity to follow logical chains of argument, deduce, induce, draw beliefs from reasoning and form theoretical standards for critical comparison*" (Sanderson, 1993, p. 189). This capacity for critical inquiry and reflection is developed through focus on liberal arts subjects such as grammar, mathematics, logic, and rhetoric as well as various discipline based subjects. Advocates of the liberal arts philosophy believe that a mind trained in an abstract liberal discipline could easily apply itself to practical matters and this way serve the needs of society. Barker (2000, p. 2) reiterates this with the argument that the goal of general education is to provide students with the knowledge, skills and values that will prepare them for active and effective participation in society. Today, general education at the tertiary education level in most countries is usually provided by means of a general bachelor's degree in any field of knowledge that aims to give an individual a broad base of knowledge.

Vocational education, on the other hand, tends to focus on the needs of society: "*Professional expertise should be developed not as a matter of idle curiosity but because of its enormous significance for the community*" (Allen, 1988, p. 21). Aldcroft (1992) asserts that education

should be less reverential about the cultivation of the mind and more concerned with the acquisition of skills that are required for the world of work, production and wealth creation. Cowper and Macintosh (1983), in the context of an industrializing world, pointed out that the industrialization of society and the concomitant need for skilled labour, such as engineers, mechanics and other technical personnel, have demanded that educational curricula embrace vocationalism. Students need to engage in learning that "*prepares them for real life and real work*" (Barker, 2000, p. 2).

Each of these approaches to higher education has been dominant at various times and in various places in the world. For example, the general education or liberal arts approach rose to prominence in both Britain and America in the late nineteenth century. The vocational approach seems to be in ascendance in many parts of the world today, particularly in the context of the current technological revolution. And indeed, as pointed out earlier, library and information services do currently find themselves in the throes of the digital age. There have been attempts to reconcile the two divergent philosophies. Years ago, Brubacher (1978, p. 80) explained that when students came from a limited leisure class, as in a traditional oligarchy, classical liberal education was satisfactory. But today, when most people work, as in a democracy, higher education must include some specialized training for earning a living. Vocational education is needed to improve one's labour-market opportunities (Dronkers, 1993). However, general education is still necessary today when one considers the student's future role as a citizen. In contemporary society, citizens must be informed and be able to comprehend, understand and debate issues that impact on the daily lives of individuals and on society in general. Furthermore, one needs to be prepared not only for a job, but also for a change in jobs, and it is for this reason as well that "*general and vocational education must go hand in hand*" (Brubacher, 1978, p. 81). Barker (2000, p. 7) points out that today's graduates will experience change at an unprecedented pace, and to cope with this change they will need adaptability and a capacity for continuous learning. It seems that it has become necessary for higher education teaching and learning to "*achieve integration of the two educational routes*" that have traditionally been separated (Leclercq, 1994, p. 52).

There have been various arguments over the years as to why a bachelor's degree is considered to be an important part of professional ILS education and training. Shera (1972, p. 327-329), writing in the 1970s, believed that librarianship must draw from and be sustained by the three great branches of human knowledge, that is, the humanities, the social sciences and the sciences. According to Shera, through an understanding of the historical development, the current state, the methodology and the critical appraisal of each of these areas, the student will acquire the wisdom and intellectual capacity required for the formation of sound judgements. Gates (1976, p. 98) too, writing in the 1970s, encouraged students preparing for graduate study in librarianship to emphasise "*broad general education in the humanities, social sciences and natural sciences*". Contemporary commentators in the field (Davidson-Arnott & Kay 1998; IFLA, 2000; Quattrocchi, 1999) continue to emphasise the importance of general education in ILS education and training. Robbins (1990, p. 42), writing in the North American context, maintains that the reason why professional ILS education and training is provided at the graduate level is because professional education requires an 'intellectual maturity' that is achieved most effectively only through the attainment of a bachelor's degree. Wilson and Hermanson (1998, p. 482) assert that the principles of librarianship only have full professional significance when they are related to a broad background knowledge of other subject matter. A librarian does not perform any of his/her skills in a vacuum, and without this academic background, the application of techniques in librarianship is simply a matter of skill and training, that is, it is technical and not professional.

The literature reviewed reveals strong arguments for the presence of general education in higher education and in ILS education and training in particular.

Empirical study

An empirical study on ILS education and training (Raju, 2002) conducted in South Africa among past students, employers and educators in the library and information services (LIS) field raised, among other issues, questions about general education in ILS education and training in South Africa. Self-administered questionnaires were used in the study, and while the return rate of questionnaires from employers (seventeen percent of the four hundred and fifty-five questionnaires sent out) may be considered to be low, there was input from significant quarters of this population that warranted analyzing and reporting. There was a significant fifty-two percent response rate (of the sixty-five questionnaires administered) from the educator population.

The majority of employers (seventy-three point seven percent) and educators (seventy point six percent) surveyed believed that general education as provided by a university bachelor's degree is essential in the provision of an efficient LIS service in most contexts. These findings correlate with the literature that has stressed the importance of general education in ILS education and training. Some comments from employers and educators included:

- Good service is dependent on the general knowledge and the intellect of the individual providing the service;
- A lack of general education is a serious impediment in LIS services;
- Information workers without a broad knowledge base are not effective;
- Generic conceptual, analytical and problem-solving skills are intellectual skills that are developed through theoretical and comparative study that should be a part of a bachelor's degree program, and these are skills and values that are required for professional leadership in a library;
- Information work not only requires 'techniques' but also general and subject knowledge to deal with in-depth consultation and guidance;
- Human and social sciences and even natural sciences provide a good foundation on which professional education may be built;
- General education allows individuals to go beyond routine processes and make critical decisions and lead institutions; and
- General education provides a better understanding of the information world and helps professionals to guide users.

(Raju, 2002)

Like these respondents, Tin and Al-Hawamdeh (2002, p. 336) also express a general concern that someone without a 'professional degree' may not have the 'appropriate judgement' to respond to reference queries in a library satisfactorily.

The study by Raju (2002) also revealed a misconception among some, particularly employers that general education is provided by a general arts degree only. The literature reviewed, particularly Shera (1972), as well some of the comments from the respondents cited above, clarify that general education is provided by a university bachelor's degree in any field of knowledge, including the sciences and other disciplines, and incorporates specific subject and discipline based knowledge. Raju (2004, p. 84) points out that perhaps the term 'liberal arts education' by which general education is also referred, and which has popularised the concept of general education, has possibly led to this misconception.

A blend of general and vocational education

Economies and societies worldwide have become knowledge driven, where the creation and dissemination of knowledge are significant processes in organizational success, as espoused by knowledge management experts such as Prusak (1997) and Nonaka and Takeuchi (1995), to name a few. The modern information professional is currently operating in a knowledge driven economy which is being powered by globalization and rapidly advancing ICTs. The dynamism demanded of the information professional in such an elusive context necessitates lifelong learning which is embodied in general education.

In order for information professionals to take full advantage of the opportunities and excitement generated by the knowledge economy, as well as to creatively meet the many challenges presented by this redefined and dynamic professional territory, the education and training of these individuals must integrate both professional or vocational training and general education. For example, many writers (Barker 2000; Bawden et al., 2005; Virkus & Wood 2004) have alluded to the need for technical ICT and information-handling knowledge and skills, as well as lifelong learning skills such as problem-solving, critical inquiry and understanding, analysis, evaluation and decision-making. Barker (2000, p. 7) appropriately points out that in order to prepare all students for effective participation in today's global society, we need a contemporary curriculum that integrates lifelong learning and vocational study so they can make sense of the forces unleashed by the combination of rapid technological innovation, globalization, and competition, which are indeed the features that characterise the current knowledge economy. By offering a blend of both general and vocational education, the ILS curriculum would also be providing students with capacities for managing change, for adaptability, and for continuous learning – all of which are required in a fast changing information and knowledge environment. Furthermore:

> "*a familiarity with the body of knowledge and methods of inquiry of the arts and sciences and a capacity to integrate knowledge across experience and disciplines may have far more lasting value in such a changing world than specialized techniques and training, which can quickly become outmoded*" (Barker, 2000, p. 7).

These words echo those of the enduring Shera (1972) who, decades ago, claimed that students of librarianship must be exposed to the humanities, the social sciences and the sciences to develop their wisdom and intellectual capacity, as librarianship, more than any other profession, is in need of a sound general education.

Conclusion and recommendations

This paper has revisited the debate on the value of general education in higher education in the context of a rapidly evolving discipline, and has drawn from an empirical study conducted in South Africa which reiterates the value of general education in ILS education and training. On the basis of this, the paper concludes that general education, as provided today in higher education in most countries by means of a general bachelor's degree in any field of knowledge in order to give an individual a broad base of knowledge, is as essential as vocational preparation for the current LIS work environment. It is for this reason that this paper recommends that the modern ILS curriculum, in order to allow graduates to meet the challenges and take advantage of the opportunities presented by a dynamic information landscape located within a knowledge based, technology driven and global economy, must capture a careful blend of general and vocational education. The modern work environment, especially in emerging information markets, demands critical thinkers, problem-solvers, innovators, creative thinkers, communicators, decision-makers, leaders and individuals who are able to analyze, evaluate and apply information, often for competitive advantage. ILS curriculum planners and designers must take cognizance of the fact that in preparation for such an environment, a balanced and integrated curriculum in which general education,

which imparts many of the above lifelong learning skills, and professional education, form complementary parts.

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Developing a Departmental Information Practice Centre (IPC) For Student Learning: A Case Study of the Information Science Department at UNISA

Extended Abstract

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Introduction: Student learning largely depends on the student's ability to gather and appropriately use information. Today, information is increasingly becoming available electronically. This situation calls for computer skills as well as literacy skills on the part of students. In its mission, UNISA's Department of Information Science lays emphasis on developing technologically able students who can make use of the technology to manipulate available information. It was in respect to this broad mission that the IPC (i.e. the Information Practice Center) was established at the Department in the late 1990s. The IPC is a mini computer lab that is fully controlled by the Department of Information Science and technical support is offered by the ICT department. The IPC is run by a committee composed of lecturers from the department and the IPC manager (illustrated in Fig 1).
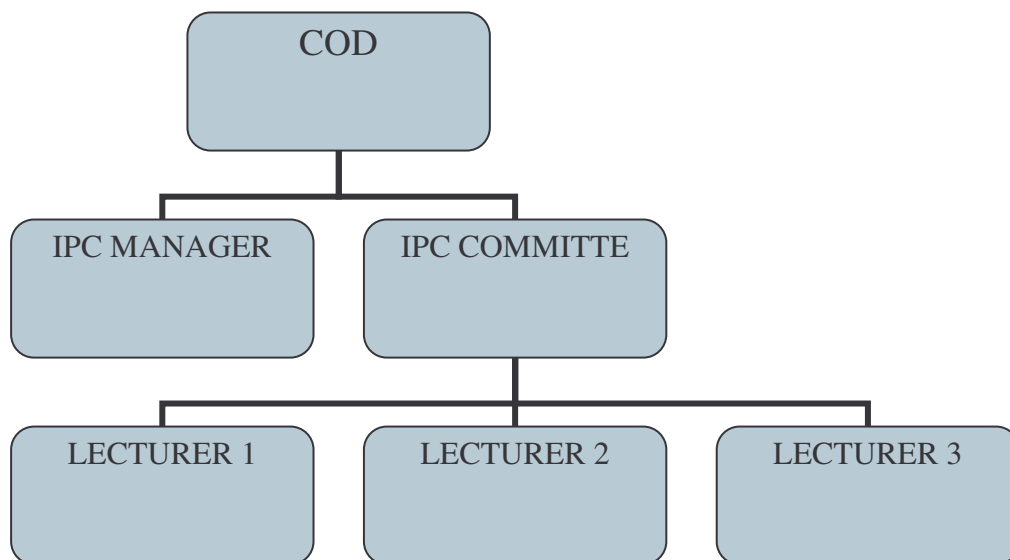

FIG: 1 (IPC's Organization chart)

The main purpose of the IPC is to support learning and teaching at the Department of Information Science. The Centre is primarily used for workshops, discussion classes and research. The other purpose is to equip students with computer skills that will enable

them retrieve and make effective use of information. Respectively, students are trained on how to use the following programs and sources of information, Microsoft Office; Internet Explorer; INMAGIC/DB Text; Dialog; CD-ROMs, etc. For computer literacy training software programs such as Comuser and Typing tutor are used.

Methodology: This study is largely informed by personal experience, a survey and content analysis. Concerning the survey, Students were requested to complete an evaluation form; they were also requested to drop their suggestions in the suggestion box. Some 150 questionnaires have been distributed to students. Content analysis was used to study attendance registers in order to track IPC usage between 2003 and June 2007. 35 students have filled the evaluation forms as well as gave suggestions

The collected data was analyzed quantitatively and qualitatively.

Preliminary Results: the evaluation form and suggestion box required students attending workshops and discussion classes to indicate and suggest areas of improvement of the IPC. In this way, students are involved in the development of the facility. They are encouraged to note that they run the facility together with the Department. Information obtained from the suggestion box indicates that students would like to have the following improvements in the lab: There should be network printers attached to the computers in the lab, Photocopying services, additional computers, Fax machine, Telephone and the introduction of advanced training in computer skills (e.g web design). Results obtained from the analysis of the attendance registers shows a consistent decline in the IPC usage over the years (illustrated in fig 2). The reduction in usage can be attributed to the following factors:

- **Semester vs. Year**: The modules in the department were offered in semesters until 2006 where they were changed to year courses. The students were using the lab more often because they had limited time to write assignments and prepare for their examinations. They had no time to waste, but after changing to the year course system students could afford to postpone their visits to the lab.
- **Attractiveness:** When the IPC started most students were attracted to it. They seem to have lost interest over the years hence there is a decline in usage.
- **Registration:** Students mostly use the lab during the first half of the year. This can be caused by the fact that the UNISA registration period runs from December to March, which leaves only three months for the students to be able to use the lab.
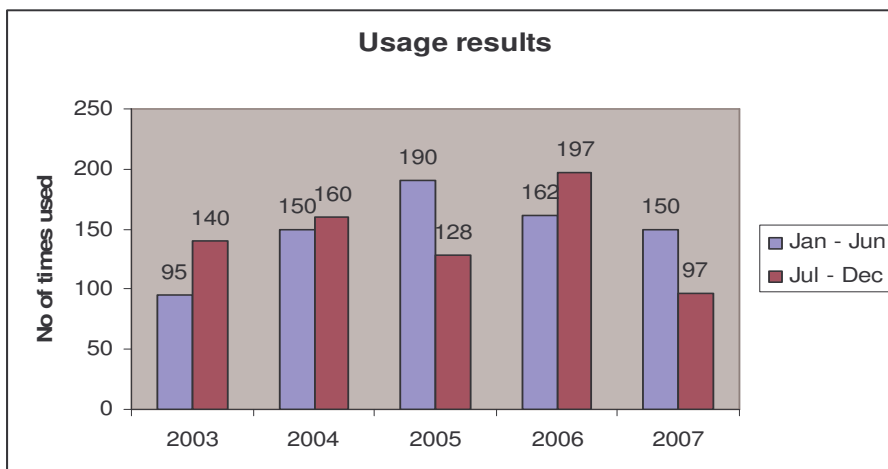

FIG: 2 (IPC usage results)

Discussion: The IPC is a good idea that needs support from all stakeholders.

Students believe that the IPC has improved their computer skills. They singled out that costs of sending their assignments online have drastically reduced. Instead of using Internet Cafes, they can send assignments from the IPC free of charge. Students' usage of the IPC consists of Email, Chatting, Internet search and MyUnisa (submitting assignments, downloading study materials, etc).

Conclusions: Training in computer skills is vital especially in the process of retrieving and using electronic information. Information Practice Centres can play a very important role in assisting information professionals to bridge the gap that is evident between themselves and computer specialists. The participation of students in developing an IPC is very essential. Students' IPC needs vary but the most common are the services that enhance their communication with the University and learning.

Recommendations: Qualified Instructors must be employed to manage and equip students with relevant computer skills. More services (e.g. photocopying, printing etc) can be offered to facilitate student learning. A student input is very important. They should be represented in the IPC committee. Usage of the IPC can be improved by upgrading computers, publicizing the services, and having good customer relations.

Women Entrepreneurs in the Information Society: A Literature Review

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Abstract

The progression from agrarian and industrial to information and advanced knowledge societies poses a lot of challenges to most communities, as it calls for a shift from primary and secondary sector activities to tertiary sector activities. This is a process that demands changes in behaviour, patterns, standards and norms. When viewed from the angle of economic development, the requirements for this progression include proper education, relevant skills, and user-friendly infrastructure, or in other words, factors that would enable the benefits of the information and advanced knowledge society to be reaped by everyone, particularly women. Sadly, women tend to be forgotten in all spheres of decision-making, empowerment and development, yet carry a much heavier load in terms of sustaining their communities, or more specifically families, through the establishment of informal businesses. As a country whose resources allow it to partly enjoy the status of being an information society, South Africa has a lot of benefits that it could place upon women entrepreneurs in the informal sector, and in so doing, reduce poverty. However, women entrepreneurs face challenges such as illiteracy and incapacity in terms of technological capabilities and relevant business skills. Furthermore, most information provision institutions, such as libraries, keep outdated collections and are without technological tools and enough qualified staff, mainly due to financial constraints. Therefore, the information deficit is still a challenge to womenfolk. This paper is informed by a review of the published literature on women entrepreneurs and the information and knowledge society within the context of South Africa. The paper covers the following: benefits associated with an information and knowledge society; South African women entrepreneurs (their education, business knowledge, skills and experiences); and current trends in assisting women entrepreneurs in the informal sector (human interface, business training programmes, etc). The conclusion and recommendations are also provided.

1. Introduction

Statistically, and in keeping with Jiyane & Ocholla's observation (2004:1), more women than men (23 817 900 and 23 070 300 respectively) constitute the South African population (Statistics South Africa, 2005: 1). Despite this, women are forgotten in most spheres of development, decision-making and empowerment, even while bearing the load of sustaining their families and communities.

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South Africa is both a productive and industrialised economy, containing within it the characteristics associated with both developed and developing countries (Wikipedia, 2007). Although there is literature that states that South Africa has only the most basic infrastructure (Wikipedia, 2007), by many ways, depending of course on the angle from which you look at the development it can also be regarded as a developed country because of the vast amount of resources it holds (intellectual, mineral, etc. This was affirmed by Foreign Direct Investment (FDI) (2005) when rating South Africa as Africa's largest economy, with a Gross Domestic Product (GDP) forecast to increase by 4,3 % in 2007 (FDI, 2005). South Africa has well developed telecommunications and cellular lines supported by different networks, which include MTN, Vodacom, Cell C, Virgin Mobile and Telkom. According to the FDI (2005), South Africa has a significant level of mobile phone ownership, although it is surpassed by Tunisia's telephone density of 390 fixed mobile lines per 1000 inhabitants, or a mobile ownership of 46 % in all households, making it the best country in Africa in terms of telecommunications. These networks' functions are to enhance the communication, sharing and dissemination of information conveniently in South Africa. The country also has a well balanced and maintained transportation infrastructure, which is the best in Africa (Wikipedia, 2007) and which supports both domestic and regional needs. On top of South African Airways, there are new, recently emerged airlines that serve the country's domestic needs, namely Kulula and Mango airlines. As a result, one of South Africa's airports, the O.R.Tambo International in Johannesburg, serves as a hub for flights to other Southern African and International countries. The South African Aviation Industry is also an industry that is capable of making light aircrafts, helicopters, and a range of aircraft components (DTI, 2005).

The railway industry in South Africa developed in tandem with the mining industry. According to the report, the two most important domestic clients are Spoornet and South African Mining companies. The FDI (2005) observed that Transnet - South Africa's public transport and Logistics Company - and its major divisions supply the biggest rail service in Africa responsible for freight, container and passenger transport.

South Africa has rich mineral resources. It is the world's largest producer of gold and platinum exports, and also supplies a significant amount of coal and diamonds (DTI Report). According to the report by the South African Travel Guide (SA Travel Guide) South Africa is one of the richest countries on the continent and in the world in terms of mineral resources. These resources make up about 60 % of the entire amount exported (SA Travel Guide).It is therefore in the company of the world's largest exporters. It supplies mainly raw materials such as gold, diamonds, platinum, chromium, vanadium, manganese, iron ore and coal.

 South Africa also boasts several major ports that make it a docking point for most trade in the Southern African region. It has 3000 kilometres of coastline and 7 commercial ports, namely, Richards Bay, Durban, Cape Town, Port Elizabeth, Mossel Bay, and East London, Saldana Bay (FDI, 2005)
The South African workforce, in the form of engineers, teachers, nurses, etc; is skilled and well educated. The quest for South African workers by international countries such as the United Kingdom, Saudi Arabia, the United Arab Emirates, etc; can be seen as a signifier of affirmation. Generally, the literacy level appears satisfactory when compared with other regional countries. Fig.1 displays the literacy levels of a few chosen countries on the African continent. According to the figure, South Africa's literacy level is among the highest with 82.4 %, between the Congo (82.8 %) and Libya (81.7 %). However, Zimbabwe has the highest level in the whole region with 90 %.

Fig.1 Comparison of Literacy rates in selected African countries
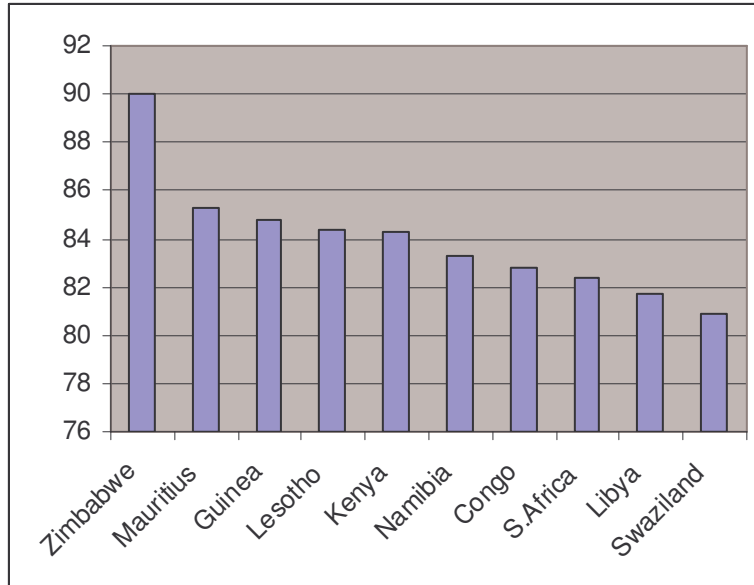
Source: APC Africa ICT Policy Monitor (2004)

The strength of South Africa's educational system was affirmed by the FDI, which rated its Universities and schools best, followed by Egypt in second place (FDI,2005). Thus, the country's skilled citizens have been behind the construction and upgrading of most stadiums, railway lines (Maputo line, Sasol expansion, Gautrain), highways and buildings, which show that South Africa is well resourced.

South Africa's relationship with regional and international countries is very good. It chairs, affiliates and is the initiator of many regional and international associations, unions and committees, such as:

- The Southern African Development Community (SADC). This was formed in 1980 by a loose alliance of nine majority-ruled states in Southern Africa, known as the Southern African Development Coordination Conference (SADCC). Its main aim was to coordinate development projects in order to lessen economic dependence on the then apartheid South Africa. However, the transformation of the organization from a coordinating Conference into a Development Community (SADC) took place in 1992.
- The African Union (AU) which was established in 2001, replacing the Organization of African Unity (OAU). One of the AU's objectives is to coordinate and intensify cooperation and efforts to achieve a better life for the peoples of Africa (Department of Foreign Affairs, 2002).
- United Nations' (UN) New Partnership for Africa's Development (NEPAD), a new vision and programme intended to halt the marginalization of the continent and bring it back on to the path of sustainable development (Okinawa Charter, 2000).
- The World Trade Organization (WTO) and African Growth Opportunity Act (AGOA) The AGOA was signed in 2004 to authorize a new trade and

investment policy for Sub-Saharan Africa, expand benefits to the countries in the Caribbean Basin and renew the generalized system of preferences, and reauthorize the trade adjustment assistance progress (AGOA, 2004: 56).

South Africa has initiated many platforms in order to share development skills and information with its citizens, some of which have attracted international communities. One such platform is Growth Empowerment and Redistribution (GEAR), which was orchestrated by the Finance Minister's (Trevor Manual) observation that South Africa is moving towards an era where there is a need for a competitive, fast–growing economy that creates sufficient jobs for all work-seekers and redistributes income and opportunities in favour of the poor; where sound health, education and other services are available to all; and an environment in which homes are secure and places of work are productive (Department of Finance,1996 :2). The Accelerated and Shared Growth Initiative for South Africa (ASGISA), formed in 2004, is also a platform designed to hasten economic and social growth in order to meet the target of eradicating poverty by 2014 and achieving an economic growth of 6 % per year by 2010 (AsgiSA Annual Report, 2006:3). South Africa's policy for Black Economic Empowerment seeks to do the same. It is a growth strategy that aims to realise the country's full economic potential (Alexander, 2006). South Africa, in addition to countries such as Brazil, India, etc, has recently been earmarked for inclusion in the G13, which is a progression from the original G8 countries (Enews Prime Time, 2007). The G8 was formed by the heads of states or governments of major industrial democracies who have met annually since 1975 to deal with the economic and political issues facing their domestic societies and the international community as a whole (G8 Information Centre, 2005). According to the report, when six countries held their first Summit in 1975 in France, the members, who called themselves the G6, were France, the United States, Britain, Germany, Japan and Italy. They were soon joined by Canada in their 1976 summit, and by the European Community at the London Summit of 1977 (G8 Information Centre, 2005). They were then known as the G7, and their membership was fixed, although 15 leaders from developing countries met with them in Paris in 1989. Russia had participated in a post-summit dialogue with the G7 since 1991, and in 1998 Russia became a full member, producing the Group of Eight or G8. The G8 has constantly dealt with macroeconomic management, international trade, and relations with developing countries. Other issues that have been recently included are employment and the information highway, and the trans-national issues such as crime, drugs, and human rights (G8 Information Centre, 2005).

All these activities, recognition and involvement are signs of great potential, resources and systems. Ocholla (2006) affirms this when he states that South Africa is endowed with a strong economy and extensive information resources, systems and services. These attributes indicate that South Africa cannot be categorised as an agrarian society.

2. Development of an Information Society

The rate of creation, packaging and use of information has accelerated. McGuirk (2006) terms this phenomenon as an 'information explosion'. According to the author, this exponential increase in information has resulted in a new type of social system known as the information society.

An information society is one where all persons, without distinction, are empowered to freely create, receive, share and utilize information and knowledge for their economic, social, cultural and political development (WSIS, 2003). 2003's World Summit on Information Society (WSIS) observed that the modern world is undergoing a fundamental transformation as the industrial society that marked the 20th century rapidly gives way to the information

society of the 21st century. According to WSIS, this dynamic process promises a fundamental change in all aspects of our lives, including knowledge dissemination, social interaction, economic and business practices, political engagement, media, education, health, leisure and entertainment (WSIS, 2003).

According to May (2002), the origins of the information society can be traced back to the work of Fritz Machlup, who was the first to categorize knowledge and information tasks separately from 'normal' industrial and social activities (May,2002:5). According to May, Machlup identified five sectors, namely education; media of communications; information machines; information services; and other information activities; which could be measured and assigned economic value.

The information society is preceded by other societies from which it differs significantly because it bears certain characteristics that are not necessarily evident in those societies.

Attempts to trace the development of an information society have been done by various authors, such as Bell (1973), Drucker (2001), May (2002), and McGuirk (2006). The development from an agricultural society is looked at from the basis of the economic activities that moved from primary agriculture via industrial-based to information-based activities. Affirming this, Toffler (1980) states that the information society has been decisively shaped by fierce 'waves' of technological innovation, each as unstoppable as the mightiest tidal wave. According to the author, the first wave was the Agricultural Revolution, the second the Industrial Revolution, and the Third Wave is the information that is engulfing us now and which presages a new way of living (Toffler, 1980). According to McGuirk (2006), the information society has been called various terms by different authors, for example information era, post-industrial era and even the computer age.

According to May (2002: 3), the idea of an information society started to appear in accounts of contemporary society in the early 1960s, but focused only on the United States. This is affirmed in studies by Machlup (1962) and Porat (1970). May (2002) divides the interest in the information society into three periods:

- From 1962 to the mid-1970s, where analyses concentrated exclusively on America.
- From the late 1970s to the early 1990s, as ICTs were deployed extensively in rich or developed states, analyses looked further afield.
- And now, analyses focus on the potential and promise of the Internet, leading to the current widespread interest in the global information society (May, 2002:4).

There has been progress and rapid changes in society since the agricultural era. The main eras were the hunter/gatherer era, the agrarian/agricultural era (farming), and the industrial era (production of goods as the main form of economic activity); followed by the post-industrial/information era - the present era - with information regarded as a key resource for political decisions, cultural change, and economic development.

Throughout various eras, humans have made use of information to increase their chances of survival and improve their quality of life. They have constantly invented new ways to store and transmit information. Certain inventions began to make radical impact on what amounted to information. By the end of the 19th century, for example, access to Television, radio and magazines proliferated. According to McGuirk (2006) the amount of information that became available in a variety of formats led to the development of the information society. The author further notes that the combination of new technology, i.e. the computer, with telecommunications has led to a tremendous improvement in information management and distribution. For example, telecommunication enables computers to be distributed over a

wide area and linked to form networks. Furthermore, the email, teleconferencing and telecommunication networks are utilized in speedily distributing and disseminating necessary information.

Webster (2006: 9) concurs with the above statement. According to the author, new technologies are one of the indicators of new society and are frequently taken to signal the coming of an information society. The new technologies Webster (2006) specifically singles out are cable and satellite television, computer-to-computer communications, personal computers (PCs), new office technologies, online information services and word processors (Webster, 2006: 9).

Giddens (2001) notes that it is widely acknowledged that ICTs are a driving force behind globalisation processes because they have been driven forward above all other developments that have intensified the speed and scope of interaction between people all over the world (Giddens in Schemmann (2003: 96).

3. General characteristics of an information society

When viewing the characteristics of an Information Society, there appears to be a shift in focus from intensive physical activities to intensive brain and intellectual application:

- In the Information Society, the accent is no longer on the general production of products and services but on the provision of information.
- There is a sharp increase in scientific labour.
- There is also a high demand for accurate and trustworthy information.
- The Information Technology is influenced by the economic market and job opportunities.
- There is an increase in information awareness and a high level of information literacy.
- There is an existing information infrastructure in place that ensures the effective flow and communication of information.

Therefore, in the Information Society, unlike in previous eras, the skills are needed to exploit information so that it is used for development, informed decision making, and planning, etc. Infrastructure, such as roads, telephonic communication networks, broadcasting stations etc; is needed in order for every citizen to be connected.

4. The informal sector's women entrepreneurs

Developing countries are not the only ones that experience the prevalence of the informal economy. Even well developed communities with advanced, well structured infrastructure, high services, resources and networks, such as the United States, have an informal sector. As Antunes & Calvacanti (2006:1) point out, the U.S., China, Germany, and Peru have an informal economy. However, the authors state that the size of the informal sector is different in each country and is dependant on the level of the country's development. For example, according to the authors, statistics from the United States suggest that the informal sector is represented by around 10 percent in the GDP, while in Peru, the sector totals an estimated 60 percent of the GDP. Accordingly in Nigeria, the Informal Sector contributes 76 % to the GDP (Fig. 2).

Fig. 2 The Informal Sector estimates of the selected countries: Antunes & Calvacanti (2006)
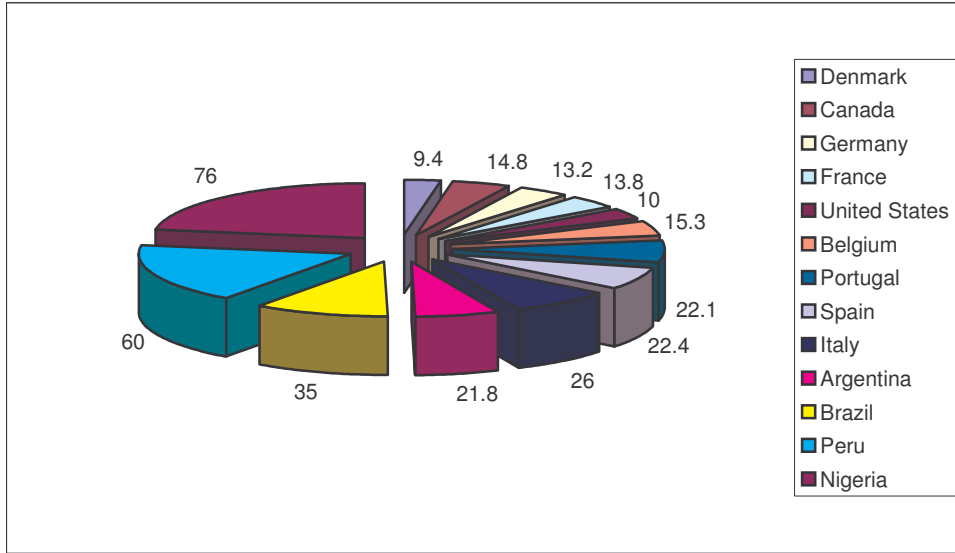
As with many other countries, South Africa has different economic sectors that contribute different levels to the Gross Domestic Product (GDP) of the country.
The informal sector is one of them. Wikipedia (2007) is in line with above segments as it affirms the two-tiered South African economy with the formal sector, based on manufacturing services, mining and agriculture, as the second one.

According to Ikoja-Odongo (2002:1) the informal sector is a fast growing economic sector for the development and employment of most small business entrepreneurs, including women.

Despite all the avenues and efforts made to boost economy in South Africa, there is still a serious decline in levels of employment and an uneven economic distribution along gender lines. In its efforts to address the above situation, the South African Government's 2002 budget has called for a moderate increase in spending to promote faster growth and poverty alleviation. This process is in line with Sotshangaye & Moller in Jiyane & Ocholla's (2004:1) observation that the present Government is actively promoting gender equality and seeking to improve the welfare of rural women and their families. Notably, the South African Government's 2002 Budget affirms the first Millennium Development Goal stipulated by the United Nations in 2000 of eradicating extreme hunger and poverty by 2015 (MDGs,2005).

South Africa has also launched special investment corridors to promote development in certain regions and is working to encourage Small, Medium and Micro Enterprise (SMMEs) development, possibly because it is now widely recognized that the sector is important in terms of economic growth, economic development, and employment generation (Department of Trade Industry (DTI), 2005: 5; Shokane, 2006:2).

Informal traders and hawkers are almost everywhere in South Africa, be it in bus terminals, taxi ranks, football stadiums, railway stations, shopping malls or alongside busy intersections (Moloto,2007). These people form part of the informal economy. In defining the informal sector, Ikoja-Odongo (2007) states that it is an umbrella term covering a wide range of business activities through which poor people earn a living. The author observes that the

informal sector has been called by many different terms in the countries in which it is found, such as parallel, undeclared, unofficial, alternative, marginal, invisible, shadow, grey, secondary, hidden, fraudulent, submarine, etc (Ikoja-Odongo, 2004:55).

The report for the National Project on Poverty and Inequality by Rogerson (1997) divides the South African SMMEs economy into three segments. First, there are the survivalist enterprises of the informal economy, which are defined as a set of activities undertaken primarily by unemployed people who are unable to find regular employment (Rogerson, 1997:2). The author characterises this group as those with income that falls short of minimum standards, and that have little investment capital, minimal skills and training and scant opportunities for upward growth or ventures into a viable small business enterprise.

The second category of business, according to Rogerson (1997), are micro-enterprises, which are very small enterprises often involving the owner, some family members and one to four employees. To Rogerson, this category also lacks the trappings of formality in terms of licences or formal premises; and entrepreneurs, many but not all, will make the transition into viable formal businesses.

Lastly, the formal Small and Micro Enterprise (SME) group, which has employment levels in the range of five to a hundred workers for small enterprises and up to 200 for medium enterprises. This group is usually owner-managed and operates from the trappings associated with formality (Rogerson, 1997:3).

The literature states that until recently, i.e. the beginning of the 1980's, almost little or nothing was known about women entrepreneurs, and that entrepreneurship studies were almost entirely concerned with men (Starr & Yudkin,1996:11; Botha,2006:114; Mattis,2004:155;Moore &Butter,1997:19). Mattis (2004) further states that little attention has been given in entrepreneurship studies to under-represented minority business-owners.

Stating the situation in Uganda, Ikoja-Odongo (2002) reveals that the working environment under which the women operate their businesses does not support documenting their situation (Ikoja-Odongo, 2002:2). Similarly DTI (2005:5) observes that the literature on women entrepreneurs in developing countries is limited, and further cautions that the literature on women entrepreneurs, particularly those in the informal sector, may not be relevant in industrialized countries.

According to Friedrich in Botha (2006:116), the South African Government's primary objective is to develop previously disadvantaged communities, which therefore includes women entrepreneurs. In terms of where or how women entrepreneurs have been marginalised, Simbwaye (2002:3) observes that they do not own any property to be used as security for the loans needed for their businesses, and they ask permission from their spouses to venture into any financial arrangements. In the same vein, Botha (2006) associates this with the cultural and social norms that have a role in women entrepreneurs' situations. The author notes with shock that these women do not have bank accounts, let alone access to finances to expand and sustain their businesses (Botha, 2006). A special report made by the DTI (2005) reveals that the factors that contribute towards the problems facing South African women entrepreneurs are race, gender, and geographic location (DTI,2005:2).

The social burden placed on women by society demands a high level of knowledge and information for women to prosper and know their rights and responsibilities in their communities (Jiyane & Ocholla, 2004: 2).

The marginalization of rural women in society is noted by several authors. Ngimwa, Ocholla & Ojiambo (1997: 46) note that women bear the largest burden of poverty. According to the authors, most women are based in rural areas where their major occupations include farming, childbearing and supporting their families. The DTI special report (2005:9) confirms the above in observing that there are low levels of women in value-adding business.

5. Factors motivating Informal Sector women to venture into business

Although women get into business from a wide variety of backgrounds, or with different levels of experience and education (DTI), Carter (2000:313) observes that they involve themselves in the informal sector primarily because of a lack of alternative job opportunities.

Moloto (2007) notes that generally, one of the reasons why people find themselves involved in informal trading in South Africa is because of unemployment and an absence of requisite skills. In Uganda, as in South Africa, informal entrepreneurs emerged out of a need to survive amidst chaos (Ikoja-Odongo (2002:2).

According to Bosire and Gamba (2003:1), in Kenya, many school leavers, those retrenched and those dissatisfied with formal wage employment resort to entrepreneurial activities within the informal sector as a way of earning a living. These reasons are also applicable within the South African context.

Similarly the situation in Uganda is not unique. According to Ikoja-Odongo (2004) the contributions to the growth of the informal sector in the country include retrenchments from public service, lay-offs in public enterprises, the demobilization of soldiers, the increase in the number of school drop-outs without formal employment, the on-going rural-urban migration, the increased entry of women and children into the informal sector, and "frozen" vacant positions in the public sector (Ssemogerere in Ikoja-Odongo, 2004: 54).

Botha (2006:121) is therefore of the opinion that informal entrepreneurship involves pull (opportunities) and push (necessities) factors. According to the author, one can be pushed into entrepreneurship by job dissatisfaction, while another is pulled by the perception of market opportunities. Repackaging this idea, Botha (2006) talks of the need for survival, the effects of job lay-offs, divorce, death of a family member, desire to improve one's employment, no other alternatives, inability to fit, career limitations, etc (Botha, 2006:121).

Ikoja-Odongo (2004:55) also notes that women opt to join the informal sector because it helps them fight poverty, gain an income for survival, and act as an alternative form of therapy from the stress caused by the lack of gainful employment.

6. Challenges facing Women Entrepreneurs within the Informal Sector

Starting any business involves a lot investment. Aside from all the daily pains and activities involved in the work, there are also hopes that it will expand and be sustained. This proves even more challenging for the informal sector's women entrepreneurs who have a lot of deficits, such as limited business skills, education and training; information; poor work environments; and a limited market for their products. Okello-Obura, Minishi-Majanja and Cloete (2006: 120) note that information is a basic requirement for enterprise creation, growth and survival. On the same vain, Wagacha (2007:2) attests to the importance of information and information access. According to the author, information is the power that

drives any development, be it economic, social or political, hence it is an indispensable component for the development of any nation

Most women in rural areas and in the informal sector are poor. The majority are illiterate or semi-literate. Most are also immersed in house chores and family matters and do not have time for themselves; hence Ikoja-Odongo (2002:2) assertion that these women do not have time to look for information. According to the author, information is a major resource that businesses require for monitoring environmental trends, products, services, markets, regulations, customers, forecasting future events, countering competitors' strategies and developing new products (Ikoja-Odongo, 2002:5). But this arguably depends on their level of education. Evidently, without proper access to information, women in rural areas lack opportunities for development and self reliance (Jiyane & Ocholla, 2004:2).Similarly, the DTI report (2005: 9) observes that these women are challenged financially, by markets, by information access, technology, business infrastructure, skills, training and development, and capacity building.

The above observation affirms the one cited by Dlamini & Motsepe that women entrepreneurs in the informal sector have problems with access to finance and the cost of finance, access to the market, access to information that supports the services available, and access to training (Dlamini & Motsepe, 2004:13).

According to Bosire & Gamba (2003), these challenges are deficiencies that contribute towards the low education levels of women in the informal sector, which in turn adversely affects their ability to access credit, overcome bureaucratic hurdles, market their goods and services effectively, and manage their finances prudently (Bosire &Gamba,2003:1). This is compounded by problems related to poverty, land and family responsibility, HIV/AIDS, finance, and education and training (DTI, 2005:10).

The DTI report further states that African women, who form the majority in the informal sector, have been worst affected by poverty, land rights and the pressure to run a home, look after children and care for the husband and family. They are also ill-equipped educationally and financially, and thus their business performance is narrowed. If women entrepreneurs could improve their literacy levels, they would have the ability to receive and make use of information effectively and thus boost their business performance. Wagacha (2007:3) also eludes to the fact that access to information leads to new financial and economic opportunities that would empower women entrepreneurs in the informal sector.

The situation in which informal women entrepreneurs find themselves is a hindrance to any opportunities that could open doors to their success. Their exclusion is not in favour of the Okinawa Charter, which stresses the potential benefits for all people as a result of the information society. The Okinawa Charter aims to include everyone, stating "*in pursuing these objectives, we renew our commitment to the principle of inclusion; everyone everywhere should be enabled to participate in and no one should be excluded from the benefits of the global information society. The resilience of the global information society depends on democratic values that foster human development such as the free flow of information and knowledge , mutual tolerance, and respect for diversity*" (Okinawa Charter on Global Information Society, 2000: 218).

7. Current trends in assisting informal sector women entrepreneurs

There is no doubt that the conditions have been levelled to benefit every citizen globally and in South Africa to develop and improve each person's social and economical situation, especially when more recently, a number of powerful international governmental organizations have started emphasizing the benefits of the (global) information society and its links to economic development (May, 2002: 4). South Africa has a number of resources that can be utilized for development, poverty reduction, and information access and dissemination. There has also been the realization, through the Millennium Development Goals (MDGs), that the empowerment of women (MDG number3) through gender equality and education would lead to improved standards of living However, the Digital Divide and its effects is still obvious among women entrepreneurs within the informal sector. The ITU-D World Telecommunications Development Conference Report (2002) states that the term 'Digital Divide' is no longer defined in terms of lack of access to telephone services, but rather in terms of lack of access to information and communication technologies (ICTs

The Information Society should serve the public's interests, especially women's social and economic needs and well-being, by contributing to the eradication of poverty, which is goal number one in the Millennium Development Goals. It is widely believed that the benefits found within the information society would uplift and empower women.

The development of information and communication technologies that bridge the gap between new enterprises and established businesses could be the way forward. This has been observed by the Okinawa Charter on Global Information Society, which states that Information and Communication Technologies (ICTs) open up potentials for humankind. According to this Charter, enormous opportunities are there to be seized and shared by us all (Okinawa Charter on Global Information Society, 2000:218).

The above statement is in line with the key principles for building an inclusive Information Society, as stated by the WSIS (2003), i.e. to improve access to information and communication infrastructure and technologies as well as to information and knowledge, and to build capacity, increase confidence and security in the use of ICTs, create an enabling environment at all levels, develop and widen ICT applications, foster and respect cultural diversity, and encourage international and regional cooperation.

The establishment of networking links, community participation, and access to national and global markets would have an impact on women entrepreneurs' business skills and experience because information would be exchanged between them and experienced entrepreneurs.

Provision of business skills training, facilitation of business incubation and mentoring and support services would assist these women in sustaining their businesses. Practical access to government and NGO initiatives would assist these women with exposure and skills to run their businesses, rather than initiatives that do not operate in their favour. The training and development programmes of these women should be organised by both the government and the NGOs. The government is necessary because most training programmes involve finance, which could be better provided by the government in accordance with its mission to support this sector; while the development programmes should be offered by the NGOs because they are found within the vicinity of the businesses and could therefore better engage themselves with the women. It is also easy for the NGOs to see the prospects of business failure and assist immediately.

As May (2002) observes, with the emergence of the information society, information has increasingly become the input on which entrepreneurs concentrate, while the importance

accorded to the control of (and access to) knowledge increasingly means that it must be contained, halting its free distribution (May, 2002: 5).

Access and training on the use of information technologies would assist women entrepreneurs in utilizing the technologies to access business information on local and global markets, communicating with fellow entrepreneurs and developing their business insight.

8. Conclusion

The informal sector is an important segment in the economy of the country. As with any other well established and recognized business that functions within the formality of business's standards and norms, the informal sector contributes towards the economy by creating jobs, decreasing the crime rate associated with joblessness and hunger, and building strong families and communities by directly supporting children's education and stability. This is highlighted by the Limpopo Premier, Moloto (2007), when he states that the little money generated by informal traders is able to put a meal on someone's table. He further notes that many hawkers and informal entrepreneurs help pay for their children's or their own university studies through the income generated from this industry. South Africa has the right infrastructure and enough resources and opportunities to assist the sector and get it to surpass all of its endeavours. Support from the government, NGOs and libraries by closely looking at the needs of the sector and assisting accordingly would also improve the way business is presently being operated and increase the sector's contribution towards the Gross Domestic Product.

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Mapping and Auditing of ICT Infrastructure in South Africa Amongst Rural Women

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Abstract
This paper aims to audit ICT infrastructure in South Africa and to account for ICT distribution amongst rural women. The study expands on information audit methodologies, such as Informap, and is largely informed by a literature review and the authors' own knowledge - empirical survey data, some of which is available in the public domain (e.g Kwake, Ocholla and Adigun 2006), Kituyi-Kwake (2007a and 2007b etc). The paper provides up-to-date information on the status of ICTs in South Africa , which could be of interest to stakeholders within the domain.

Introduction

Information audit and information mapping are closely related, in that they create an awareness of an information environment in order to assist with informed decision making processes and interventions that would improve the lives of the community they serve. Although an information audit is generally considered to be a process of information needs analysis, the audit may be defined variably. For example, Robertson (1995:33) considers an information audit to be a routine gathering process that is sometimes limited to creating an inventory of information resources (e.g. hardcopy, on-line services, application soft-ware, individuals with special knowledge and expertise etc). Booth and Haines (1993:36) consider an information audit to be the systematic examination of the use of information, its resources, and its flow, with verification by way of reference to both witnesses and documents. Thornton (2001:128) is of the opinion that an information audit is a mechanism that should allow the mapping of an organisation's information processes, showing the links between the communication process, the users of information within the organisation, and the means by which information is transferred and used. The purposes of an ICT audit therefore include: determining what the ICT requirements of an organisation or community are and how the ICT can best fulfil the needs; evaluating the effectiveness of an existing ICT system or service to find ways of making their operation and services relevant (cost effective and cost beneficial) (see Stanat,1995:2); determining what services the population needs and how these needs are being addressed (see Clair, 1995:22); and identifying the strengths and weaknesses of a system, e.g. the attitudes, practices, levels of satisfaction, and problems encountered by the service consumer. Ideally, ICTs were created and developed to serve people. Thus their main objective, in our view, is to support, supplement or replace human activities or efforts by increasing productivity and performance and providing a convenient environment for work and leisure. ICT audits are therefore useful, in that they identify: the ICT management goals and objectives

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of an organisation or service unit; ICT gaps, inconsistencies, or the duplication of efforts; new ICT products and services; amendments or changes to an existing system; the strengths and weaknesses of ICT products and services; and the attitudes and practices of staff and management with respect to IT products and services and their gathering and distribution. Furthermore, audits determine current ICT channels and identify additions to the system by evaluating: an existing system, current ICT needs, effectiveness of current ICT resources, effectiveness of information distribution and user technology, and ICT needs by functional area, department, or service community.

The aim of this paper is to audit and map ICT infrastructure in South Africa and to account for ICT distribution amongst rural women.. The paper is largely informed by a literature review, which involved a survey of newspaper articles, government documents and company reports.

The paper addresses the following:

1. National policies and strategies on ICT that are in place in South Africa
2. How national policies/ strategies are implemented in South Africa
3. The type of ICT infrastructure and resources currently found in South Africa

2 M apping and auditing of ICTs in South Africa and among rural women

2.1. National Information Policies

The Government of South Africa (GSA) has placed a strong emphasis on ICT sector development through the implementation of a National ICT strategy, particularly for disadvantaged segments of the society (also see The Academy for Educational Development [AED] n.d.). The report states that the GSA's Department of Communications began the process of developing legislation in the telecommunications human resource base in 1995 and 1996. The 1995 Green Paper on Telecommunications Policy and the 1996 white Paper on Telecommunications Policy formed the basis of the 1996 Telecommunications Act. Specific initiatives include the Info.com 2025, which addresses issues of policy, infrastructure, human capacity and local content within ICT industries. Info.com 2025 supports IT related projects, and also seeks to "*empower people in the way they work, live and play, and make South Africa globally competitive*". Its major objective is "*to facilitate and promote education and training through the use of telecommunications technologies*". Other programs include the establishment of community information centers, public information terminals, Internet connectivity in schools, and training for teachers.

The South African Information Technology Industry Strategy's (SAITIS) focus is on building infrastructure, especially within secondary towns designated as export zones, for both ICT and non-ICT products and services. Through the establishment of the Universal Service Fund, both wire-line and wireless service providers have extensive obligations to provide access to previously disadvantaged regions with low income and geographic complexity (SAITIS: 2000). South Africa has also been involved in the Southern African and Far East (SAFE) initiative to promote the connectivity of all African countries through regional backbones that do not leave the continent. According to the report, it is hoped that SAFE will reduce the cost of calls that are currently routed through Europe (SouthAfrica.info:2006).

The Academy for Educational Development [AED] (n.d: 4) denotes that other initiatives by the GSA include the Technology Enhanced Learning Initiative (TELI), which aims to support curriculum development at grade eight level, offer vocational education, develop information literacy courses for

use in schools, and initiate community centers and industry based training sites. Another government initiative is School Net South Africa, an organization devoted to expanding Internet use in South African Schools. The AED contends that School Net SA is one of 25 School Nets in Africa, and apart from the support that it receives from the GSA's Department of Education, it also receives support from the private sector, i.e. Microsoft, Cisco, Nortek, Sun, #Com etc. A few activities conducted by this initiative are: Internet connectivity, human resource development, advocacy and marketing.

In another survey conducted by Accenture, Markle and UNDP (2001), the GSA introduced three important taskforces to address the deployment of ICT as an enabler of social and economic development. These include:

i) The Presidential International Task Force on Information Society and Development which is to focuses mainly on global ICT markets)

ii) The National IT Task Force which will deal with the issue of "brain drain" and the deployment of ICT initiatives locally and

(iii)   The IT Council whose aim is to handle local and provisional government IT functions

In addition, the government announced the establishment of the Investment Council, which focuses on positioning South Africa's imports and exports globally and generating foreign direct investment through international collaborations.

Accenture, Markle and UNDP (2001) further assert that the Information and Communication Technology (ICT) policy in South Africa now incorporates telecommunications and e-commerce. While these are discrete policy and legislative processes, the two are intertwined within the joint national strategies of equitable development and economic growth.

       Likewise, Research ICT Africa (2004) denotes that the telecommunications sector in South Africa has been in a process of "managed liberalization" since the second phase of reforms in this sector were passed in the Telecommunications Amendment Act of 2001. According to the Government Communication Information System [GCIS] (2006/7:133), this act has enabled the Department of Communication in South Africa to liberalize the telecommunications market, increase competition, and stimulate the sector in order to bring down the cost of communications. The GCIS further reports that section 40 of this act requires that serviced area licenses provide telecommunications services, voice-over internet protocol, fixed mobile services, and public pay telephones. Mobile operators are also allowed to use any fixed lines for providing both voice and data transmission services.

Following this, the Mail&Guardian (2007) reports that South Africa's Second National Operator (SNO) has now been licensed to operate a publicly switched telephone network. According to the report, South Africa's SNO, namely Neotel, was finally launched in August 2006, and is set to help reduce the high cost of telecommunications in South Africa. According to the report, Neotel has secured access to the relevant Eskom and Transnet Infrastructure, including 10,000km of fiber optic backbone within metros and across the country.

2.2   Universal Access Policy/Universal Service Agency [USA] - currently known as the Universal Service and Access Agency of South Africa (USAASA).

The GCIS (2005/6:133-134) reports that the USA was launched in 1997, and is a statutory body whose objectives include advising the minister on ways to bring about universal access and service, and

coordinating initiatives by service providers such as Telkom, Vodacom, Mobile Telephone Network (MTN) and Cell C . The USA also works with Community Based Organizations (CBO's), Non-Governmental Organizations (NGOs), donor organizations and businesses. The report states that the Universal Service Fund is used to reinforce the development of infrastructure in under-serviced communities.

Recent reports from the USA (2006) indicate that while the USA will now be known as the Universal Service and Access Agency of South Africa (USAASA), the Universal Service Fund will be known as the Universal Service and Access Fund (USAF). By the same token, the Department of Communications in South Africa (2006) illustrates that the mandate of the Universal Service and Access Agency is to promote, facilitate and monitor the achievement of universal service and access in under-serviced areas, with respect to communications, and also to manage the Universal Service Fund.

All–in–all, the two tables over the next four pages provide summaries of South African national goals as they relate to the Universal Access and National ICT Policy.

According to Parkinson (2005:37-38), the key policies guiding universal access are the Telecommunications White Paper of 1996, the Telecommunications Act of 1996 and the Telecommunications Act Amendment of 2001. The author further states that the 1996 Act set up the regulatory body for telecommunications (South African Telecommunications Regulatory Authority - SATRA), which in 2000 merged with the broadcasting regulator (Independent Broadcasting Authority - IBA) to form the Independent Communications Authority of South Africa (ICASA).

In Table 1, Parkinson (2005:35) draws on documents and public statements from leading government officials and summarizes the key policy intentions regarding universal access in South Africa.

In Table 2, Audenhove (2003:135) gives an overview of the most important policy initiatives as they relate to ICTs and the information society. The table is organised according to areas of developmental strategy; infrastructure; content and applications and skills; and institutional capacity. Different policy processes impacting on and relating to the information society come from a wide variety of sectors and different departments.

Policy documents or initiatives	Description of the programme or part of the programme	Responsible department or institution
DEVELOPMENTAL STRATEGY (economy, industry, technology and innovation)		
White Paper on Science and Technology (November 1996)	Science and technology policy geared at innovation and growth	Arts, Culture, Science & Technology
Foresight (June 1999)	Prospective study directed at a long-term economic and industrial growth strategy	Arts, Culture, Science and Technology

Centre for Educational Technology and Distance Education (1997)	Centre responsible for policy preparation in respect to distance education and technology in education	Education
South African Information Technology Industry (IT) Strategy (2000)	Industrial strategy for the IT sector	Trade and Industry
Schoolnet SA (November 1997)	Infrastructure in the educational sector	Education, communication, Trade and Industry
Growth, Employment and Reconstruction (June 1996)	Neo-liberal policy framework for economic development	Presidential Office and Department of Economy
State Information Technology Agency	New structure responsible for IT in government. Should lead to a better integration of systems and networks	Public Service and Administration
e-commerce	Overall policy to stimulate and regulate electronic commerce	Communications
INFRASTRUCTURE (networks and infrastructure)		
Telecommunications Act (November 1996)	Establishes a new policy framework for telecommunications	Communications
Telkom	...provide new framework responsible for network extension and universal service mandate of Parliamentary Portfolio Committee on Communications	Communications (as major shareholder)
Satra	Responsible for regulating the telecommunications sector	Communications
USA	Responsible for the promotion of universal service and access. De facto responsible for the implementation of telecentres	Communications
GCIS	Responsible for the implementation of MPCC's and the coordination of telecentre initiatives	President
Supporting local development through information provision	Mandates of DoC, Universal Service Agency	Education

Table 1. Summary of South African national policy goals related to universal access

(Source: Parkinson, S. 2005: 35)

Goal	Evidence/where stated (not exhaustive)	Implementation mechanisms
Universal access to telecom (and broadcasting) service, redressing historic inequities	Telecommunications Act 1996, revised Act 2001 mandate of Parliamentary Portfolio Committee on Communications	Regulatory authority (ICASA), licensing agreements, Universal Service Agency, Universal Service Fund
Delivery of government services including social services (e-health, e-education, etc.)	Eg, Department of Education White Paper on E-education (2003), research commissioned by PNC ISAD	Various government departments, GCIS, PNC ISAD Universal Service Agency under 2001 mandate
Improvement of communication between government and citizens	RDP 1994	Various government departments co-ordinated by GCIS (own services)
Democratization, diversification of media and expression	RDP 1994, MDDA Act 2002	DoC, MDDA, Department of Arts and Culture
Technology-enhanced Learning Strategy (May 1997)	Strategy to translate the earlier TELI in concrete initiatives and projects	DoC, GCIS, Universal Service Agency, various government

			CONTENT AND APPLICATIONS
Supporting SMMEs and job development / Educational and vocational policy in general	ICT Economic Empowerment Charter (2004 in progress) / In as far as it provide people with broad skills to function in society and in modern institutions and organisations	Department of Trade, Labour and Industry, ISETT SETA, Universal Service Agency under 2001 mandate / Education, Labour	
Employment Equity Act (October 1998) / Creating an South … information society	Presidential speeches, e.g 2001 State of the Nation address, Telecommunications White Paper 1996 / Set state of the policy framework to support disadvantaged groups	Various: DoC, Universal Service Agency, Labour Department of Arts and Culture, presidential task forces	
Technology-enhanced Learning Strategy (May 1997)	Strategy to translate the earlier TELI in concrete initiatives and projects	Education	
GCIS	Responsible for government communication and development communication	President	
White Paper on Broadcasting Policy (May 1998)	New policy framework for the audiovisual	Communications	
Broadcasting Act (April 1999)	Legislation reforming the audiovisual sector	Communications	
Schoolnet SA (November 1997)	ICT applications for the educational sector	Education, Communications, Trade and Industry	

SKILLS

Educational Policy in general	In as far as it provides people with the right skills to function in the information society	Education	
National Qualifications Framework (from 1996)	Qualifications and certification system for the education system	South African Qualifications Authority	

INSTITUTIONAL CAPACITY

White Paper on Public Service (November 1995)	Reforms the old apartheid structures in one public service with one public administration	Public Service and Administration	

Table 2 Policy initiatives and actors

Source: Audenhove (2003:135).*Towards an integrated information society policy in South Africa*

In spite of all these efforts on ICT policy formulation, Parkinson (2005:34) reiterates that the main problem with the act is that it has overlaps and does not clearly establish the roles and responsibilities of the agency and the regulator. Audenhove (2003:6) believes that South Africa still lacks a "*formal vision of the information society in the form of an integrated policy or policy document*", as different departments drive policy processes. According to Audenhove (2003:135), there is a need to coordinate this broad body of different policy areas and integrate them with broader macroeconomic and developmental policies.

2.3 National gender policies

According to the Academy for Educational Development [AED] (n.d:4), the South African Government is committed towards gender equity in IT and "*creating an enabling environment for South African women to participate in IT training programs*". The Commission on Gender Equality, the National Gender Forum housed in the Department of Justice, and the Office on the Status of Women in the Office of the President, are examples of government efforts that have been initiated in order to emancipate women. Others include initiatives in the telecommunications sector, embodied in the Department of Communications', Gender, Youth and Disability Desk. Their aim is: "*to integrate gender, youth and disability sensitive perspectives in all departmental programs and policies... The Department will also ensure that empowerment strategies, policies and legislation designed to ensure more meaningful participation of historically disadvantaged citizens, are sensitive to biases which exclude equal participation in the communications sector of the economy*" (AED, n.d:5).

2.4 ICT services

Telephones/Telephone Density

Research ICT Africa (2004) reports that the telecommunications sector in South Africa is characterized by relatively high retail prices, super profits, job losses, licensing delays, and deadlocks with minimal new foreign investments. Nevertheless, according to the DoC [USA] (2006:21), South Africa's telephone system is the best developed and most sophisticated on the African continent. The report explains that domestic systems consist of carrier-equipped open-wire lines, co-axial cables, microwave radio relay links, fiber-optic cables, radiotelephone communication stations and wireless local loops. Currently, Telkom has well over five million main fixed lines in use.

Cellular Mobile Telephony

The cellular industry in South Africa has witnessed tremendous growth over the years, and currently there are four mobile operators, namely: Vodacom, MTN, Cell C and VirginMobile. *Vodacom* initially started commercial operations in 1994, with a modest subscriber base of 50,000 (Cellular Online, 2004). These figures rapidly soared, and in May 2006, Vodacom connected its 20 millionth subscriber in South

Africa (GCIS, 2006/7:137). It is the market leader in South Africa and has more than 5700 base stations around the country, ensuring that in excess of 95% of all South Africans are within the coverage area of its impressive cellular network. As at 2004, Vodacom had deployed more than 24,767 community services telephones in previously under-serviced areas, compared to the license obligations of 22,000.

M*TN* was awarded a license in 1993 and provides access to 94.5% of South Africa's population (MTN South Africa, 2005). According to GCIS (2006/7:137), MTN International offers cellular network access and associated services through its subsidiaries and joint ventures in Nigeria, Cameroon, Uganda, Rwanda and Swaziland. Currently, Allafrica.com (2007) records hold that by May 2007, MTN South Africa had a subscriber base of 13,030,000 million.

Cell C consortium started its operations in 2001, and as of 2004, had 3 million users. Of the 1.9 million active users, some 84 percent - or 1.6 million of its subscribers - were prepaid users, and 16 percent contract (Cellular Online, 2004). Current reports from Moneyweb (2007) indicate that the Cell C subscriber base now stands at 3.3m.

The fourth mobile phone service is *VirginMobile* (see Mobile Africa, 2007), which is a virtual network operator that was launched in South Africa in June 2006. Mobile Africa reports that the cellular company uses Cell C network infrastructure to provide cellular communications services to subscribers in South Africa. Virgin Mobile offers voicemail, international roaming, sms, mms, internet caller ID, and flexible billing.

2.5. "Old" Technologies/Broadcasting (Radio and TV)

2.5.1. Radio

According to Erasmus (2005:1), South Africa's broadcasting history can be traced back to the early twenties, when South African Railways made its first wireless broadcast in Johannesburg. This led to the first radio station, "JB Calling", which was transmitted by the Associated Scientific & Technical Club of Johannesburg, then the Durban Pietermaritzburg Calling radio service (transmitted by the Durban Corporation), and the "Cape Town Calling" radio service (transmitted by the Cape Peninsula Publicity Association). However, an untimely onset of financial constraints led to the dissolution of all three radio services and the formation of the African Broadcasting Company (ABC) in 1927 by the Schlesinger Organization. The author narrates that upon further investigation, the South African Parliament, under Act 22 of 1936, formed the South African Broadcasting Corporation (SABC).

Public Broadcast Services include:

Mishkind (2006) illustrates that public broadcasting services are owned by the SABC and are transmitted in indigenous languages. These services include:

(i) SAFM (the SABC, JHB) - National English program

(ii) RSG (in Afrikaans Radio Sonder Grense) - National Afrikaans programme

(iii) Ukhozi FM (SABC, Durban) - Regional Zulu programme

(iv) UMhlobo Wenene (SABC, Port Elizabeth) - National Xhosa programme

Radio 2000 (in JHB) - National music and entertainment station

Ligwalagwala FM (SABC, Nelspruit) - Regional Tsonga Programme

Munghana Lonene (SABC, Polokwane) - Regional Tsonga Programme

Thobela FM (SABC, Polokwane) - Regional Lebowa programme

Phalapala FM (SABC, Polokwane) - Regional Venda programme

Lotus FM (SABC, Durban) - National Indian programme.

On the whole, the South African Broadcasting Corporation (SABC) has 18 radio stations that broadcast in 13 languages. Well over 19 million adults in South Africa tune into these stations daily (DoC-SA, 2005).

2.5.2   Television

Four major television channels can be identified, the first of which is the SABC. GCIS (2006/7:141-142) states that the South African Broadcasting Corporation (SABC) has three free-to-air channels, which broadcast in 11 languages. According to the report, these channels reach a daily audience of almost 18 million people, and have more than four million licensed television households. Second is ETV (see e.t.v. nd), which is South Africa's first private free-to-air television channel, and was launched in 1998. The e.tv channel broadcasts a full-spectrum programming service to 78% of South Africa's population, and is owned by the Black Empowerment Group, Hosken Consolidated Investments Limited and Venfin Limited. Third is M-Net. GCIS (2006/7:142) illustrate that M-Net is South Africa's first private subscription television service, and was launched in 1986. M-Net channels are delivered through analogue terrestrial and digital satellite distribution, and offer movies, sport, children's programmes, international and local series, and local reality shows. Fourth in this category is *Satellite broadcasting.* MultiChoice Africa [MCA] was formed in 1995 to manage the subscriber services of its sister company, M-Net, and became the first company on the continent to offer digital satellite broadcasting. Operations include subscriber-management services and digital satellite television platforms, which broadcast 55 video and 48 audio channels, 24 hours daily (GCIS 2006/7:142).

2.6 Telecommunications Systems

Satellite links

Milne, et al (2004:1) reports that Stellenbosch University developed the first successful micro-satellite program, SunSat (Stellenbosch University Satellite). SunSat 1 was South Africa's first Satellite to reach orbit and was launched in February, 1999. The authors state that South Africa's second satellite - Sunsat 2004 (again from the University of Stellenbosch) - was launched late in 2005. South Africa's third Satellite, named "Sumbandila" (meaning "lead the way"), is an 80-Kilogram micro-satellite and is expected to orbit the earth at a height of 500-kilometers (Southafrica.info 2006:2). Accordingly, this satellite will be used to support, monitor and manage disasters such as floods, oil spills and fires.

In a supplementary report to the International Steering Committee [ISSC], the Square Kilometer Array (SKA) (2003:48) illustrates that Telkom has an extensive fiber-optic cable network deployed in South Africa, which also penetrates into the rural areas. By the same token, Telkom SA (2006:2) reports on the SAT3/WASC (Southern Africa-Western Africa Submarine Cable), which is a 15000 Km high performance fiber optic cable linking Europe with South Africa and a number of countries on the West African coastline. Telkom SA (2006:2) reports that this project will bring the power of high speed connectivity to Africa, sophisticated communications, paperless faxing, access to the world's research facilities, and access to news almost instantaneously. Furthermore, businesses will be able to engage in e-commerce, open up new markets, expand distribution, and reach various buyers, suppliers and other service providers.

Wide area networks [WANs e.g. the Internet]

The Online Publishers' Association (OPA) and the international ratings company Nielsen/Net ratings, in Government Communications and Information Systems [GCIS] (2006/2007:135), indicate that South African websites are attracting an increasing number of local and international consumers. By June 2006, readership or unique browser figures had reached 4.6 million, and page impressions had hit 115 million (*Please see the list of licensed ISPs found in South Africa, courtesy of the Internet Service Provider Association of South Africa [ISP] (Ispmap2006) in the index.*

Equipment

(Network Base stations)

According to Cellular Statistics (2004), more than 5500 Vodacom base stations provide coverage to 60 % of the geographical area of the country.

3.Distribution and management of ICTs amongst South African rural women

Women'sNet (2006) reports that Women's Net was launched in March 1998, as a joint initiative between the South African Non-Governmental Organisation Network (SANGONET) and the Commission on Gender Equality (CGE). According to Women'sNet, Sangonet was established as WorkNet in 1987 to provide regional electronic information and communications networks to NGOs in South Africa. In 1993, Sangonet's scope widened to include development and human rights workers, and the provision of accessible and affordable electronic communications infrastructure, including the provision of information. Following the election of a democratically elected government, the Commission on Gender Equality (CGE) and [Sangonet] initiated Women'sNet in 1998.

Women'sNet (2006) exists primarily to serve women's information needs in a user-friendly way and therefore to: make ICT technology accessible to women; change the flow of information from North-South, to South-South; empower and train women in the use of electronic media; and for women's economic empowerment; among others. Women's Net prioritizes women who do not have access to technology, particularly rural women, NGO's and Community based organizations, self employed women, and government information workers.

Women's Net (2006:2) further illustrates that its priorities include: making ICTs accessible to women, particularly disadvantaged women; providing gender-sensitive training and support in the strategic use of the internet; linking projects, people, tools and resources through the empowerment and support of technology planning processes within women's civil society organisations, and through the exploration of free, open source software solutions (FOSS); creating a platform for women's voices and issues through the Women's Net website and through capacity development; facilitating the

dissemination of information in formats accessible to women who are not directly linked to the Internet; facilitating collaborative website development; and the strengthening of women's networks.

4. Conclusions and recommendations

Evidently, South Africa is actively involved in creating and developing information and communication technology infrastructure for the improvement of ICT access and use. The GSA's [South Africa's] Department of communications began the process of developing legislation in the telecommunications sector in 1995 and 1996. The 1995 Green Paper on Telecommunications Policy and the 1996 White Paper on Telecommunications Policy formed the basis for the 1996 Telecommunications Act.

Notably, national policies and strategies on ICT in South Africa are implemented by a cross section of government departments/institutions that range from Arts and Culture; Science and Technology; Trade and Industry; Communications; Education; and the Presidents office. Once again, according to Audenhove (2003:148), what appears to be lacking in South Africa is a central institution that can steer initiatives and coordinate policy. The weaknesses of South African ICT policies are worth analysing, as this would assist with the future implementation of such policies. Questions worth asking include: has the policy increased competition and liberalised ICT investment, access and use? Has it accelerated the penetration of services into marginalised or under serviced areas (e.g. rural areas)? Has the policy streamlined the regulatory framework?

Access to ICTs by women is closely linked to the level of access to ICTs amongst marginalised or under privileged communities, and how the ICT policies alluded to earlier address issues of this nature. Among the different strategies, Marcelle (2002:3) calls for the empowerment of women through the enhancement of skills, knowledge, and access to ICTs. This includes making improvements in access and promoting initiatives that include rural women and women in the informal sector. Additionally, women could take full advantage of the opportunities offered by information technology if more education at all levels, from basic literacy through to scientific and technological education, is offered. Women are also not likely to benefit equitably from ICT projects unless special efforts are made to identify their needs, and effective action is taken to incorporate their active participation in project implementation and development. As it stands, women not only have less access to the technology itself, but are also financially limited and have less time to learn to use the technology. Women are also absent from decision-making positions in information technology within developing countries. Whether the increased employment of women in decision making positions in South Africa contributes, in any way, to the rapid roll out of ICTs amongst deprived communities is worth interrogating.

Conclusively, gender considerations are crucial from the beginning of project design or the planning stages of the project under consideration. Gender considerations include: (i) the need for gender–disaggregated data on projects, especially those involving training; (ii) the need to correctly assess skills before training, as more women than men may have low skill levels in information technology, and this would necessitate adjusting training accordingly; (iii) the need to take into account gender specific cultural constraints, such as women's family responsibilities and/or difficulty in attending evening training sessions; (iv) and the need for post training follow-ups to ensure access, combat cultural constraints and promote skills retention.

Apart from providing women with a platform that enables participation in the decisions taken regarding their lives, there is a need to: ensure that correct and accurate information is availed to women at all times; expose rural women, through the use of ICTs, to what other women are doing in other parts of the world/country in similar settings/situations; build individual capacities through skills-enhancement programs; and provide seed funds for initiating projects. Interrogating the

strengths and weaknesses of existing ICT infrastructure, policies/legislations, management and access within and between the countries is important for improving the access and use of ICTs.

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A comparative Study of the Job Functions of University and University of Technology Graduates in the Staff Structures of Selected Academic Library Services and Health Care Services in the Durban Area.

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Introduction

The thorny issue of professional status in the discipline of Library and Information Science (LIS) has been a long-standing one. Evidence of this can be extracted from the vast amount of literature made available by scholars in this field. There has been much to debate about and alas, a few feathers ruffled during these discussions. More importantly though, stemming from these debates have been a lot of developments as well as promise thereof, in terms of how the professional status in the discipline is viewed. This paper aims to highlight some of the inconsistencies suffered by LIS university and university of technology graduates when appointed in positions in staff structures of some organizations. It also reports on the practices applicable in the health care discipline where, like the LIS discipline, graduates from both the university as well as the university of technology are accommodated in their organizational structures. The purpose here is to find? any best practices or possible trends that can be of significance to the LIS discipline in alleviating the current situation, where there seems to be a lack of clarity when it comes to assigning incumbents certain positions within organizations in the LIS discipline.

Objective of the study

The objective of the study was to investigate the job functions of university and university of technology graduates in the academic library and health care environments with the intention of drawing on possible trends and best practices in the health care environment for the LIS work place. The research questions that were generated to meet the above objective were:

- What are the job functions of university and university of technology graduates in selected academic libraries in the Durban area?
- What are the job functions of university and university of technology graduates in health care services in the Durban area?
- Are there any trends and best practices in staff structures in the health care environment that can be adapted/adopted for the LIS work place?

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Perceptions of the LIS professional status

The issue of professionalism in libraries plays a vital role when it comes to employment patterns. It is therefore important that we have an understanding of who the potential employees are for any type of organization, and for which specific job functions they are required. In this paper, the potential incumbents discussed are the graduates who emanate from the university and from universities of technology (formerly known as technikons). The university graduate is traditionally viewed as the professional, and the University of Technology Graduate deemed the paraprofessional. These perceptions have, however, been altered by recent technological advances, as stated by Neal (2006: para. 1). He maintains that there has since been much blurring of functions and status between the two categories of graduates.

Addressing this matter then, the Department for Professional Employees in the United States of America (DPE) (2001: para. 3) argues that professional librarians administer libraries and perform services such as selecting, acquiring, cataloguing, classifying, circulating, and maintaining library materials. It is further argued that professional librarians may furnish the reference, bibliographical and advisory service to the patrons.

According to Tin and Al-Hawamdeh (2002: 335), in general, paraprofessionals are employed in most libraries to perform administrative support and background duties on top of their provision of basic reference services to the public. In most cases a librarian supervises them. They furthermore state that the duties performed by paraprofessionals vary from institution to institution.

It is perhaps this lack of standardization, in the researcher's opinion, when it comes to the allocation of job functions that has contributed to what could be a conflicting situation in the relationship between professionals and paraprofessionals. In the literature (Neal 2006; Tin and Al-Hawamdeh 2002) it has been proposed that clear and distinct roles of paraprofessionals should be formulated. The American Library Association (Congress on Professional Education (COPE) 2003: para. 2) also suggested that a task force be established to put in place career ladders that will consider standardized job titles and the training and development of paraprofessional staff. This suggestion is also applicable in the South African situation as there also resides here, in the opinion of the researcher, a lack of clarity when it comes to the job functions of LIS paraprofessional staff. The researcher believes that there should be some degree of clarity on which category of employees should perform which duties in library and information services (LIS services), and thus graduates coming from both the universities and universities of technology would be employed in positions that are relevant to the skills and knowledge acquired through their education and training.

Employment trends in libraries

It is proposed by Raju (2004: 9) that there seems to be a lack of clarity among the majority of the people associated with library and/or information science as to the relationship between university and university of technology first level library and/or information science education and training. She states that LIS educators need to decide what to teach, at what levels and for which posts in the library environment. She further alleges that the situation of uncertainty is further aggravated by the fact that universities of technology in South Africa, which had previously offered non-degree programmes only, have begun to offer programmes leading to the degree qualification. The researcher believes that only when some degree of clarity is available in the LIS work environment, will there be clear job functions for each category of employees. Furthermore, groups of staff would feel less undervalued or threatened by other groups as their job functions in relation to their

qualifications and their significance in the organizational structure of the library would be clearer.

Mhlongo (1998: 106) pointed out that technikon LIS diplomates occupy positions which are administrative or clerical as opposed to the positions that they should in fact occupy because of the education and training they have received. This can be related to the graduates from universities of technology as there is reason to believe, as stated earlier, that they seem to occupy positions for which they have not been educated and trained to perform.

In turn, this can perhaps be attributed to the fact that libraries, like many other organizations, have been affected by new technologies and the resulting changing job content. The prospect of the "virtual library", for example, according to the Department of Professional Employees in the United States DPE (2001: para. 1), has generated fears of job displacement for many library professionals. It is further noted that a library with new information technology will undoubtedly relocate tasks between professionals and paraprofessionals, and this they note, will create new uncertainties. As technology changes library operations, paraprofessionals have taken on a number of tasks that were the domain of librarians, and the job responsibilities and the content of professional librarians and paraprofessionals have been dramatically altered. In this context, a study that examines the job functions of university and university of technology graduates was deemed crucial.

What is apparent in the literature is that there need to be clear distinctions in the allocation of duties in order for library work to progress. In South Africa, both the category of professionals and paraprofessionals exist in the LIS work environment. What possibly needs to be accomplished is a clear understanding that both categories are greatly required by the library and information organization. Furthermore, they perform different duties as they have different types of qualifications and therefore possess different types of skills.

Research methodology

In order to gather data to meet the requirements of the stated research questions, the two data collection instruments that were used were the self-administered questionnaire and the structured interview. Structured interviews were conducted to collect data from a purposefully selected sample of managers in academic library services as well as in health care services in the Durban area. The self-administered questionnaire was used to collect data from a selected sample of employees in the academic library services. This questionnaire did not apply to the staff members in the health care services as the researcher believed that data collected from their employers would be sufficient to give the researcher an understanding of the practices in their work environment.

The academic library services from which the researcher drew respondents were:
  ➢ B.M. Patel Library located at the Durban University of Technology;
  ➢ Mc. O'Dowd Resource Centre (Mangosuthu Technikon); and
  ➢ E.G. Malherbe Library at the University of KwaZulu-Natal, Howard College Campus.
The health care services identified for participation were:
  ➢ Addington Hospital;
  ➢ St. Aiden's Hospital; and
  ➢ Entabeni Hospital
These institutions were conveniently selected because of their close proximity to the researcher. In terms of the health care institutions, government hospitals (Addington and St. Aiden's) were selected as well as a private hospital (Entabeni) to try and identify if within these sectors there are possibly any differences in employing professional and

paraprofessional graduates. In the end however, the researcher was only able to secure an appointment with one health care service, Addington Hospital. The researcher also chose academic libraries from universities as well as universities of technology to allow for a comparison of possible differences and similarities in the employment of professionals and paraprofessionals in these higher education institutions.

Any attempt by a researcher to make raw data more meaningful requires the use of statistical methods. The use of statistical inference is relevant where, according to Bryne (2002: 72-73), the researcher wishes to draw conclusions and make generalizations. This method suited this study as it is comparative, and conclusions and generalizations, where applicable, had to be made. Since it was a small study, the services of a statistician were not employed. Instead the researcher did the analysis herself. The use of computer software packages such as Microsoft Office, which has features that allowed the researcher to present the findings graphically, were employed. On the basis of trends revealed after this analysis, discussions and interpretations of the findings were done. Conclusions were drawn and recommendations made on the basis of these discussions.

Main findings

The study revealed that there are varying practices when it comes to the employment of university and university of technology graduates in the staff structures of academic libraries in the Durban area. There are organizations that view both the university qualification as well as the University of Technology Qualification as professional qualifications, therefore allowing graduates from the latter institution to be awarded professional status. The academic library located in the traditional university has continued with the traditional convention of viewing traditional university LIS graduates as LIS professionals (Raju 2004), while the academic libraries located in the recently emerged universities of technology seem to embrace a more progressive view of considering certain categories of university of technology graduates (e. g. B Tech.: LIS graduates) as LIS professionals as well.

The manager of a major public hospital in Durban indicated that they distinguish between professional and paraprofessional positions. He pointed out that positions such as those of Medical doctors, Pharmacists, Dieticians, Speech therapists, Radiographers, etc. are recognized as professional positions. It is important to note that the qualifications for the above mentioned positions are obtained from both or either one of the two types of academic institutions, that is, universities and universities of technology. Both types of qualifications are recognized by the hospital as professional qualifications, even though some of them (e. g. Radiographers, Speech therapists, etc.) are generally considered to be technician personnel. The positions categorized as paraprofessional are administrative and clerical positions. The manager also indicated that they do not employ incumbents in terms of the institution they have qualified from, but instead look at available positions and employ incumbents as required. Applicants from both the university and the University of Technology are treated in the same way; no graduate is given preference over the other.

Summary and conclusion

This paper has provided a discussion on the issues surrounding the allocation of duties to graduates from universities as well as universities of technology in academic libraries. It discussed the role that the graduates from these institutions play in the organizational structures of the academic libraries. Langley, Gray and Vaughan (2003:1-2) maintain that libraries are very slow to change. The question they ask is how change can be instigated in such an atmosphere. In their view, we need to look outside the profession to other models of behaviour to see what we can do better. In view of this suggestion, it would benefit the LIS discipline to look to other disciplines, such as health care services, for ideas on how university and university of technology graduates can be accommodated in staff structures, as there is a lesson to be drawn from this discipline for the LIS field. Perhaps then, as learnt from the health care services, the LIS discipline should take on a more progressive role when it comes to the employment of incumbents, where it is not the institution qualified from that earns you a position, but instead, and the graduate's ability to perform required tasks. It is important to note that this was a limited study conducted in a small geographical area of Durban. It is hoped, however, that a study on a wider geographical area - currently being undertaken by the researcher at masters level - would allow for more comparison between the LIS discipline and the health care services, and in that way allow for a better generalization of the results generated by the study.

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A Comparative Study of the Job Functions of University and University of Technology Graduates in the Staff Structures of Special Library Services and Engineering Firms in the Durban Area

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Abstract

This study investigated the job functions of university and university of technology graduates in the staff structures of selected special libraries and engineering firms in the Durban area. The intention of the study was to draw on possible trends and best practices in the latter for the LIS work environment. The target population for the study was university and university of technology graduates of conveniently selected special libraries and engineering firms in the Durban area. These organizations included the Amalgamated Beverage Industries Ltd., Conlog: Prepayment Metering Systems, Ethekwini Water and Sanitation (engineering firms) and Engenoil Library, Shepstone and Wiley Law Library, and the Oceanographic Research Institute Library (special libraries). Graduates were chosen for inclusion using a census, in many cases because of the smallness of the staff in these organizations. Two sets of questionnaires were issued, one to the graduates and one to the employers of the selected organizations. Findings of the study revealed that the majority of National Diploma: Library and Information Studies (ND: LIS) graduates who supposedly should be in support functions are performing professional job functions, whilst this is not the case in the engineering discipline. Engineering graduates tend to occupy job titles and functions according to their highest academic qualifications. The study did not reveal any significant trends in the staff structures of the engineering work environment that may be applied to staffing in the LIS workplace.

Research Problem

A (2004) study by Raju confirmed that the university Postgraduate Diploma in Library and Information Studies (LIS) and the B.Bibl. (or equivalent four-year university degree) are established professional qualifications in South Africa. However, the National Diploma: LIS (ND:LIS) is generally viewed as a paraprofessional qualification and there is uncertainty as to whether the Bachelor of Technology (B.Tech.) is a paraprofessional or professional qualification. In the American context, Neal (2006) found that an increased number of individuals hired in libraries to fill professional positions do not have the master's degree, which in America is the basic professional qualification. The researcher has noticed a similar trend in one of the special libraries in South Africa. The supervisor, who would normally be termed the Head librarian, has no qualification in LIS other than a general undergraduate

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degree, whilst a subordinate who is given the job title 'Senior librarian' is holding a master's degree in LIS and is performing paraprofessional functions. This subordinate has a professional qualification obtained from a university, but is currently performing paraprofessional functions with no room to move 'up the ladder' of the special library.

Whilst so many issues of qualifications exist within the LIS profession, there is evidence that librarians are battling for potential positions with graduates from other disciplines. Freeman (1993) talks of LIS schools providing specialists (eg. Law Librarians) or generalist librarians. Jenkins (2005) points out that in the ancient world, libraries were staffed by persons whose training was often in another field. History seems to be repeating itself with graduates from other disciplines beating LIS graduates for positions. Not surprising then, a recent advertisement for a special library Principal Librarian required a nurse with five years experience in the nursing field.

With seemingly so many distinctions and "anomalies" regarding qualifications in the profession, the researcher wanted to find out the roles played by university and university of technology (UOT) graduates in special libraries and engineering firms in order to draw on possible trends and best practices from the engineering environment for the LIS workplace.

Research Methodology

Graziano and Raulin (2004) state that research methodology is concerned with answering specific research questions. Accordingly, three critical questions were formulated addressing issues related to the job functions of university and UOT graduates in special libraries and engineering firms. Being a small study, the researcher conveniently selected three special libraries and three engineering firms in Durban from which to draw its population. Participating special libraries and engineering firms included Engenoil Library, Oceanographic Research Institute (ORI) Library, Shepstone and Wiley Law Library, Amalgamated Beverage Industries (ABI) Ltd., Ethekwini Water and Sanitation, and Conlog: Prepayment Metering Systems. As each of these organizations have relatively small staff complements, there was no need to draw a sample of the target population. A census was done instead. To increase the validity of the data collected, employer representatives in these organizations (at least one each) were also targeted for data collection. Although interviews seemed a viable option for this study, as they almost guarantee the sample population to provide one with the required data, the researcher administered two different questionnaires to graduates and employers because questionnaires allow anonymous and reliable data. These were hand delivered, collected and analyzed manually by the researcher. There was a positive response, with a 76% and 72% return rate on the graduate questionnaires and employer questionnaires respectively.

Findings

Raju's study found employers utilizing the ND: LIS qualification as a requirement for support functions such as library assistants, technicians, etc. However this study revealed conflicting views on this issue.

Three of the five special library respondents (60%) indicated that they were holding a ND: LIS. However, the study revealed that not all the ND: LIS graduates were holding support

positions. Two of the three graduates do not hold support positions. The Engenoil Library has three graduates, two of which hold a ND: LIS while the third has a B.Tech.: LIS. Some would assume that the graduate with the B.Tech.: LIS qualification would hold the position of Librarian as this qualification is viewed by some as professional. However the graduate with a ND: LIS is occupying this position. The study revealed that the ND: LIS graduate (Librarian) has been occupying this position for 16 years, whilst the B.Tech.: LIS graduate (Library Assistant) is not that far off with 12 years in his/her position. However, the B.Tech.: LIS graduate obtained his/her qualification in 2002 while in the position of Library Assistant.

Notwithstanding all of this, it is evident that this special library is happy to attach the designation of Librarian to an incumbent with a ND: LIS. The US Department of Labor (2005) mentions some of the job functions performed by a library assistant, which include computer searching, calculating statistics on circulation, and assisting in customizing databases. In looking at the job functions of the B. Tech.: LIS graduate and Librarian discussed above, the B. Tech.: LIS graduate performs more or less the same job functions as that of the Librarian. However, the former's job functions appear to be at an assisting level to the Librarian. Howarth (1998) defines the paraprofessional librarian as being a "shadow librarian". This is evident in the Engenoil Library where there seems to be a very thin line separating the job functions of the Librarian and the B.Tech. Library Assistant.

Another ORI Library graduate holds a professional university qualification (B.Bibl.) and his/her job functions correlate with that of a professional librarian. The employer for the library surveyed responded that both university and UOT graduates are accommodated for positions, but generally UOT graduates are employed for positions in the organization's library. This librarian has held this position for the last seven years (she obtained her qualification in 1981), and again the study reveals that experience seems a major contributing factor in obtaining/maintaining positions.

Howarth states that "*in some large academic or public libraries decisions about which materials to purchase or repair and when, are the responsibility of a professional librarian*". She also mentions "*some medium sized libraries as determined by the size of the collection assigns this task to the paraprofessional*". It is evident that special libraries sometimes have only one employee, as is the case at the Shepstone and Wiley Law Library, where the UOT graduate holding a paraprofessional qualification (ND: LIS) assumes the job functions of both a professional and a paraprofessional.

Raju (2004) pointed out that the UOT qualifications are often the result of an interaction between the technikon (now UOTs) and industry. This study revealed that UOT graduates of special libraries stand the same chance of obtaining jobs as university graduates. Technikons are now UOTs and should be more aggressive in marketing their qualifications. In Raju's (2004) study, she highlighted that there is a difference between university and UOT education - the former has an academic focus and the latter a technological focus. Marketing the value of the qualification for industry would allow employers to recognize that these qualifications are meant to be different and perhaps they would correlate accordingly in terms of job titles and functions. Both engineering firms and special library services require graduates to have technical skills, often of a high level. As an employer from the ORI Library pointed out, there is a lot of scope for technical as well as scientific development in their field.

This study revealed that a majority of UOT LIS graduates occupying professional and support functions are for now, UOTs. There is evidence in the study suggesting that in

special libraries there does not seem to be much correlation between job titles/functions and the type of institution that LIS graduates come from.

The engineering environment revealed that five (63%) of the eight engineering firm graduates are from universities, whilst three (38%) are from UOTs/technikons. The study revealed that engineering graduates holding the B.Tech/T4 engineering qualification from the technikon/UOT or a B.Sc. (Engineering) university qualification are assigned professional job functions, such as that of managers. A graduate holding a ND: Engineering was assigned a support position and functions as a technician. It seems that in the engineering environment, both university and UOT four-year qualifications are accepted as professional qualifications.

The study found that engineering firm graduates are occupying positions and performing job functions according to their highest academic qualifications from technikons/UOTs and universities. UOT graduates with the B.Tech. Engineering qualification are occupying managerial posts in the engineering field, although one of the employers surveyed said the qualification is seen as paraprofessional by the organization. However, there seems to be a general correlation between the education received and the job functions they are performing. On the other hand, special library services seem to have inconsistent positions with regard to this, as some of the graduates with the ND: LIS are not holding support positions but professional librarian positions. The special library employers who completed the employer questionnaire indicated that both the ND and B.Tech. LIS qualifications are often viewed as professional qualifications despite the fact that the B.Tech graduate at Engenoil Library thinks his/her qualification is viewed as paraprofessional. The researcher feels that since both qualifications are often viewed as professional, there is no discrimination in assigning tasks to university and UOT graduates in special libraries.

Conlog: Prepayment Metering Systems has graduates with the B.Tech. and T4 engineering qualifications, and the graduates responded that their qualifications are viewed as professional by the organization. However, the employer responded that this qualification is viewed as paraprofessional. The Ethekwini Water and Sanitation graduates all view their qualifications as professional, including the graduate with a National Diploma. However, of the two managers surveyed, one viewed the National Diploma as a paraprofessional qualification. Here too there seems to be some degree of inconsistency between employers themselves and between graduates as to the professional and paraprofessional status of UOT qualifications.

Conclusions

Based on the above discussions the study draws the following conclusions:
- UOT and university LIS graduates occupy similar job titles/functions irrespective of their highest academic qualifications in special libraries.
- UOT and university engineering graduates occupy job titles/functions according to their highest academic qualifications;
- Engineering organizations tend to view the ND: Engineering qualification as paraprofessional and the B.Tech.: Engineering as a professional qualification; and
- Special libraries view both the ND: LIS and B. Tech.: LIS as professional qualifications.

These are some of the general trends in staff structures in special library services and engineering firms in the Durban area. There do not seem to be any marked or novel practices in staff structures in the engineering environment that may be applied to the LIS workplace. The engineering environment also seems to be grappling with the university and UOT issue.

In view of the smallness of the study, it was recommended that perhaps a larger study with a bigger sample of employers and graduates would possibly reveal if there are any significant trends and best practices that the LIS workplace may draw on to more efficiently accommodate university and UOT LIS qualifications in staff structures. The researcher is currently engaged in such a study at master's level.

A comparative Study of the Job Functions of University and University of Technology Graduates in Selected Public Libraries and Newspaper Houses in the Durban Area

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Introduction

The University of Technology generally concentrates on providing training in the practice of technology and on vocational preparation, that is, preparation for specific occupations. The university, on the other hand, concentrates on providing training in the practice of science (the word/term as denotes all scholarly activities), including research, and mainly the general side of the spectrum of vocational preparation. As a result of the different types of education and training received from universities and universities of technology, graduates from these two types of higher education institutions bring with them different sets of knowledge and skills to the work place. Do these differences have an effect on their job functions and where they are placed in the staff structures of their organizations? This study intended to determine whether or not Library and Information Science (LIS) graduates and Journalism graduates from the two types of higher education institutions shared the same job functions in the staff structures of public library services and newspaper houses in the Durban area. The choice of journalism as a discipline for comparison stemmed from the notion that journalism, like library and information services, receives graduates from both traditional universities and from universities of technology. Such a comparison, it is hoped, would allow the researcher to draw on possible trends and the best practices in staff structures in the journalism environment for the LIS work environment.

Objective of the study

The objective of the study was to investigate the job functions of university and university of technology graduates in the public library services and journalism environments, with the intention of exposing possible trends and best practices in the latter for the LIS work environment. In order to meet the above objective, the study addressed questions such as: What are the job functions of university and university of technology graduates in the staff structures of public libraries and newspaper houses in the Durban area? And what, if any, are the trends and best practices in the staff structures in the journalism work environment that can be adapted or adopted for the LIS work place?

Motivation for the study

In public library services and newspaper houses, one will generally find employees with either a university qualification or a university of technology qualification. In the LIS sector, these graduates are employed both as paraprofessionals (library assistants) and as professionals (librarians). The researcher aimed to determine whether the type of higher education institution the employee graduates from plays a role in the job functions of the different employees. If the job functions of these graduates were found to be different, the researcher aimed to determine the cause of this, especially in the case of a graduate with a B.Tech. Qualification from a university of technology and a graduate with a four-year

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traditional university LIS qualification. As this was a comparative study, the researcher wanted to look into the journalism work environment to ascertain whether the situation there was similar in terms of qualifications and the institutions from which these qualifications were received. As mentioned before, the choice of journalism as a discipline for comparison was based on notion that journalism, like library and information services, receives graduates from both traditional universities and from universities of technology.

Literature review

According to Mouton (1996: 119), it is essential to relate one's work to an existing body of theoretical and empirical knowledge. Conceptualization, which is the integration of one's study within a larger conceptual framework, involves incorporating one's research into the body of knowledge that is pertinent to the research problem being addressed. In order to do this, Mouton states, the researcher must first do a thorough literature search for previous theoretical and empirical work in a given field, and then relate his/her work to the existing literature.

Ocholla (2001: 1) traced LIS graduates from the University of Zululand to their current places of employment and interviewed them together with their employers in order to determine whether the knowledge, skills and attitudes gained during training were adequate for their current job requirements. Ocholla's study aimed to review the LIS curriculum of the University of Zululand. This study among others reveals that LIS curriculum of universities of technology as well as universities should be reviewed regularly in order to determine their relevance to the work environment.

The journalism environment appears to have issues that are in keeping with the LIS environment when it comes to education and training at tertiary institutions. Wright (2004: 1) feels that journalism education in South Africa needs to change. She states that the traditional divide between the "theory pusher" and the "vocational trainers", often exemplified in the difference between university and technikon (now university of technology) courses, has become increasingly blurred. Wright (2004: 7) adds that a balance between the vocational-practical aspects of journalism and the rich academic-theoretical component is vital. The author states that "*it is no longer enough to offer one or the other*". Institutions must strive to integrate both to produce journalism graduates with all the required skills necessary to make top-class journalism a standard in South Africa. Is the same not applicable to the LIS profession as well?

According to Christie (2005: 4), the South African curriculum reform of the last ten years has not only been in response to a new democracy, but also to the demands of the market. Christie states that universities are marketing themselves, and higher education has become a commodity that is branded, advertised and sold. Christie's view is that universities are marketing themselves by selling the idea that a university education will give the student the ability to find a job upon graduating. Furthermore, many universities have, in recent years, created vocationally oriented degree programmes that appeal to a vocationally oriented market. Although journalism has been taught in universities for decades, it is a vocation, and students need to be prepared for the vocation. Christie (2005: 8) further states that the primary focus of a university journalism programme is the study of the phenomenon of journalism, and not necessarily learning the skills that the industry needs and wants. However, according to Mokwatedi (2005: 6), the debate about universities of technology providing practical training and traditional universities teaching theory is no longer an issue, since some universities have established news laboratories for the practical training of students. These universities produce newspapers, and some even have radio stations.

What the researcher draws from this is that practical training is part and parcel of journalism education and universities are recognizing this, hence the creation of these "news laboratories" and radio stations. There appears to have been the realization that journalism students in universities should not only be taught theory, but should also be taught practical skills (like university of technology students) in order to meet the demands of the journalism industry.

Methodology

According to Babbie (1998: 89), research design addresses the planning of scientific enquiry – designing a strategy for discovering something. Although the details vary based on what one wishes to study, there are two major aspects of research design. First one must specify as clearly as possible what one wants to find out. Secondly, one must determine the best way to do it.

Neuman (1997: 89) states that the survey researcher follows a deductive approach. He or she begins with a theoretical or applied research problem and ends with empirical measurement and data analysis. Once a researcher decides that the survey is an appropriate method, the basic steps in a research project – research design and data collection – can be divided into two phases, which is the design and planning phase, and the data collection phase. In the first phase, the researcher develops an instrument which, for the purposes of this study, was a survey questionnaire and an interview schedule. This is then followed by actual data collection.

In order to fulfill a comparative study of the graduates from the two types of higher education institutions in selected public library services and newspaper houses in the Durban area, questionnaires were administered to a selected sample of the graduates employed at selected public libraries and a newspaper house in the Durban area. Questions about qualifications, job designations and functions were asked. Structured interviews were conducted with a selected sample of managers from public libraries and the newspaper house in order to assess their selection criteria in relation to qualifications and the employment of staff members. A combination of data collection tools in research has often been found useful in terms of increasing the validity and reliability of the data being collected.

In this study, the researcher investigated two populations, namely university and university of technology graduates in the selected public libraries and newspaper houses, and the employers in these organizations. As this was a small study, the researcher was unable to study the entire population, and therefore settled for a sample.

There was a need for stratified random sampling because respondents in the selected public libraries and the newspaper house come from both universities and universities of technology. The researcher focused the study on the central region of Durban, mainly due to convenience and easy access, and selected 12 libraries and one major newspaper house (i.e. Independent Newspapers) in the surrounding region

The researcher personally administered questionnaires to staff members in the selected public libraries and had a return rate of 80%. The researcher also administered questionnaires to staff working for the *Mercury* newspaper at Independent Newspapers, and 48% of the questionnaires were returned.

Interviews were conducted with the District Librarian from Ethekwini Municipal Libraries and with the Senior Librarian for Departmental libraries. The researcher also conducted a very detailed interview with the News Editor of the *Mercury* from Independent Newspapers.

Findings

Of the 20 LIS graduates surveyed in the public library services, 35% percent were university of technology graduates and 55% were university graduates. 10% of the respondents only had a high school (Matric) qualification. From the *Mercury* at Independent Newspapers, 83% of the respondents were university of technology graduates, while 17% of the respondents graduated from colleges. There were no traditional university graduates. It was evident from this small sample that both types of organizations generally employ both graduates from universities and universities of technology. This was supported by the interviews with the managers from both organizations. There also seemed to be a trend amongst the public libraries of employing mostly traditional university graduates, whereas the newspaper house appears to employ mostly university of technology graduates.

According to Howarth (1998: 535), the role of paraprofessionals, such as those employed as library assistants or assistant librarians, has been that of "handmaidens" to professional librarians. That is, they work alongside and in support of professionals such as librarians. This appears to be the trend in public library services in the Durban area. The survey questionnaire administered to LIS graduates indicated that those who have university qualifications are generally employed as Librarians, Senior Librarians and Branch Librarians. Those with a university of technology qualification tend to be employed as assistants. There was only one instance in which a university of technology LIS graduate with a B.Tech. held the professional post of Librarian. Perhaps this is an indication that public libraries are beginning to recognize the University of Technology four-year B.Tech. LIS qualification as on par with a professional university LIS qualification, as suggested by the managers interviewed. Unlike in the LIS profession, the journalism work environment does not distinguish between professional and paraprofessional positions. In journalism, all positions are considered professional.

In the case of journalism graduates, who in this study were mostly from universities of technology, all graduates have the same job designations and job functions, whether the graduate carries a Diploma or a B.Tech. Qualification, and/or even a university qualification. Everyone is expected to start at the bottom as a reporter and work their way up the career ladder through hard work and dedication to the profession. A good qualification is an advantage, but it is hard work, according to the News Editor of the *Mercury,* that counts.

While both EML managers interviewed stated that where employees graduate does play a role in job designations and the functions of graduates, the manager from the newspaper house stated that this aspect does not play a role. What can be deduced from the journalism environment is that they believe in a basic qualification for professional work in the field, and it does not matter which type of higher education institution this qualification is obtained from.

Conclusion
Based on the findings of the study, it was concluded that the job functions of university and university of technology graduates in the staff structures of selected public libraries in the Durban area are different. Those who carry university qualifications seem to occupy more professional positions, such as that of Librarian, whereas a university of technology graduate would occupy a paraprofessional position, such as that of Library Assistant. Evidently, the University of Technology B.Tech. LIS is, however, beginning to be viewed as a professional qualification on par with the university LIS qualification.
To enter the journalism work environment, graduates need a basic qualification and then work their way up the career ladder. In the LIS work place, it appears that one's qualification is the key to upward mobility in the work place. A graduate with a Diploma remains in a lower position, unless he/she studies further. While qualifications are important, perhaps the LIS field has become overly preoccupied with them to the detriment

of good service, which is often the outcome of hard work, enthusiasm and dedication to the profession, a culture that the journalism work environment seems to promote. The LIS work environment could learn from this.

The findings of this small study have encouraged further investigation into the issues raised, primarily because if the findings are applicable on a broader scale, the LIS field could and should consider drawing on some of the trends set by the journalism environment in order to alleviate some of its own work place difficulties, especially those relating to the qualifications of its employees. The researcher is currently engaged in this study at master's level.

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