Editorial

There are seven articles in this issue of AJLAIS. The first article on bibliometric studies in South Africa by Omwoyo Bosire Onyancha reports on the results generated from a case study of the LIS researchers' output using three methods of publications count namely, adjusted count ($\mathbf{A}_c$), complete count ($\mathbf{C}_c$) and straight count (S_c). The second article by Jaya explores considerations for the design of information literacy education for the African developing context. This is followed by the article on information literacy delivery in Nigerian Primary Schools by G.U. Onyebuchi and M. N. Ngwuchukwu. In an empirical study, they found that there is significant difference between the information literacy skills of pupils participating in library period programme and those not participating. The fourth article by M. K. Khayesi, W. J. Meyer and M. Machet is an empirical study that examine the influence of personal and environmental factors on information behaviour of home-based elderly people in Kenya.

The fifth article by P. Dewah, discusses corporate knowledge leakage in three Southern African Development Community (SADC) member States. It examined how knowledge loss affected public broadcasting corporations' performance. The sixth article by Obasola and Mabawonku, reports the descriptive survey of digital access control methods of some universities in Nigeria and found that none of the respondents was aware of anti-circumvention laws and digital rights management systems. The last article under the Short Communication section, by R. Mushi and M. Maharaj, describes Health Information System in Tanzania.

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Editorial Feature

The Changing Face of Library and Information Science Profession

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The field of what was once renowned as librarianship has evolved and significantly transformed from the 1940s through such nomenclatures as library studies, library/information science, information science, information management/knowledge management, and informatics. Through this transformation, archives and records management which was once a distinct discipline has progressively been integrated into the library/info disciplinary space. As a result of these transitions, librarianship has evolved to become a highly interdisciplinary infospace as reflected in the diversity of papers carried in this current issue of AJLAIS. Despite the transformation of librarianship into ''new nomenclatural disciplines," there remains an inextricable link between the umbilical cord of librarianship and the emergent 'info' disciplines.

This editorial feature is therefore devoted to the transformation of the field of librarianship to date. The transformation of librarianship over the years has been occasioned by many factors, but two stand out: the infusion of ICTs in virtually all library and information related training programmes and the changing needs of labour market characterised by new employment opportunities in business, industry and government. Many empirical studies support this thinking. For example, a tracer study conducted by Aina and Moahi (1999) in Botswana suggested the need to revamp library and information studies curriculum to address the new labour market needs. The study recommended a review and expansion of the scope of LIS academic programmes in order to produce a new breed of LIS professionals to take advantage of the expanding job opportunities in all sectors of the Botswana economy. Such new breed of library and information professionals would manage the production, storage, sharing, utilisation and communication of knowledge within and out of organisations in the private and public sector. This change of focus in the training of LIS professionals may be explained by the fact that information is increasingly regarded as a factor of production, more important than traditional factors such as land, capital and labour. Many countries, especially in Asia, have often been cited as successful economic stories in part because of their prudence in transforming themselves into knowledge-based economies. There is also evidence emerging that globally, LIS programmes which have been slow in adapting to paradigm shifts in the information environments are experiencing declining enrolments.

The fact that librarianship has undergone significant paradigm shift since the 1980s is no longer a matter of empirical studies. Greater competition posed by the proliferation of information services that are not library based and the increasing use of information and communication technologies, especially personal computer, the Internet, electronic database, electronic data retrieval methods and the emphasis being placed on knowledge management are factors in the transformation of librarianship. The transformation of librarianship has in equal measure occasioned changes in the classic role of the librarian. The book keeping role has progressively evolved into information management role characterised by the librarian getting increasingly engaged in perfecting tools and procedures to enhance easy access to materials, creating portals, gateways, and hypertext links to resources. The librarians now serve as knowledge managers responsible for harnessing expertise of each other by working in teams, and mentoring junior colleagues. As information facilitators

in the information age, they are being called upon to help people to use resources, enhance outreach services to various users such as faculty, and work with users at the desktop to show them how to use databases. The librarians' role now includes information consultation where they work behind the scenes helping software designers to develop systems that fit into users' information seeking capabilities. They are also increasingly getting involved in developing and imparting information literacy. They are facilitators for providing effective search strategies, educators familiar with literature and information in many formats; and information intermediaries, responsible for providing current awareness services and liaison between the seeker of information and the information itself (Stueart, 2006).

The evolving roles of LIS professional has necessitated a wide range of new skill requirements such as information search skills; value adding skills (e.g. research skills, packaging information to support in decision making); IT skills; transferable and soft skills that are generic and cut across disciplines including: communication, management, leadership, teaching and training, teamwork; appropriate attitudes, values and personal traits; ability to handle change; continual learning and an entrepreneurial attitude; domain knowledge that is specific to the type of information service or organisation they are working in (Stueart, 2006). As a result of the transformation that has taken place in the nomenclature librarianship, it has given way to library and information science, which in turn has evolved into information science or information management in 1990s. The trend the world over is the recognition of information management field as inextricably intertwined with knowledge generation, sharing and application. This is based on the understanding that every aspect of information transformation process involves people who are constantly engaged in the generation, processing and exploitation of both tacit and explicit knowledge. Several library and information science programmes that were in the past known by such nomenclatures as librarianship, library and information studies, library science, library and information science or information science have now evolved into 'information management', 'knowledge management', 'information and knowledge management' or 'informatics'.

The transformation in librarianship is increasingly being reflected in the curricula of LIS schools, as well as publishing outlets where library and information management professional journals such as: AJLAIS, Journal of Knowledge Management, International Journal of Information Management, South African Journal of Information Management, Libri, Information Development, Online Information Review, the Archivist, Archivaria, the electronic Library and other published articles that cover wide range of subjects on information and knowledge management rather than librarianship or archives and records management per se. Gorman (2003), is of the view that many topics regarded as central to library education, such as cataloguing, reference, collection development, are no longer central to or even required by today's LIS curricula. In its place are subjects such as user modelling, information visualisation, human computer interaction, business taxonomies, strategic intelligence, social and organisational informatics, e-commerce, computational linguistics, computer programming for information management, etc.

Crowley observes that in 1960, all library school programmes had 'library' in their titles. By 1986, 54.4% had both 'library and information' included in their names (Voos, 1985). In 1998, some schools had no longer the word, library, in their names at all. The name change has often been followed by curriculum changes as a tactic that has worked to attract students to the LIS academic programmes. Studies have shown that the broader the name, the more students that can be attracted. Crowley (1998) says the word 'library' has very negative connotations in the for-profit environment. Name change therefore tells potential students that the field of information science is not limited to librarianship and graduates can work anywhere, whether in library, corporate setting or government. The name changes reflect the breadth, depth and diversity of careers requiring information and knowledge management. The proposed Bachelor of Information and Knowledge Management (BIKM) programme in some library and information science schools is an innovative, modern and revamped curriculum.

Universities have since 1980s changed names of departments or programmes to reflect the dynamic nature of the information environment. In Africa,

some of the LIS schools that have specifically changed names of their information science programmes to information and Knowledge Management include: the University of Johannesburg, University of Stellenbosch, Durban University of Technology and University of Namibia. Similarly, changes have been reported in Poland (Sroka, 2002) and China (Chu, 2001). In China, there were over fifty schools of 'information management' in mid 1985 and by the end of 1990s, they changed their names to become variously known as 'schools of mass communications, knowledge and information management', 'information management and communication' or ' business administration'. In Japan, Takeuchi (1999) observes that only 3-4% of all qualified graduates find employment in libraries, with the remaining finding jobs in other fields. Takeuchi expressed the need to produce professionals who can function not only in library and information environments but also in designing, build and managing new digital information systems and services from human centred perspective.

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. Changes are occurring in core subject areas, with emphasis being placed on information/knowledge management. In addition, there are decreasing opportunities for new employment in library markets due to the over-production of LIS graduates. There is also 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.

The impact of transformation of librarianship has had positive effects. For example, the LIS School at University of Ghana, Legon dropped the word, library, from its name followed by curriculum review. The change of name and curriculum has witnessed significant increase in enrolment year after year with applicants to the programme expecting to learn computer-based information management courses (Dazie, 2008). The name and curriculum change at the University of Johannesburg involved replacing "information science" with information and knowledge management. This change resulted in increase in enrolment with the department having the largest number of students (estimated at over 600) compared to similar library schools in 12 universities in South Africa, (Du Toit et al., 2009). Ocholla (2009) notes that departmental name change occurs for many reasons. Among them are: amalgamation, absorption, disintegration, student attraction, growth, re-orientation, market demand, change of affiliation among others.

The transformation of librarianship profession has enhanced access and participation in higher education in LIS training because of diverse option and choices in academic programme offerings. Therefore, the current issue of AJLAIS focuses broadly on four themes: bibliometrics, information literacy, information behavior, ICT/knowledge management/local content and health informatics. These four themes in combination, demonstrate the need to determine the impact of paradigm shift in librarianship on scholarly output of knowledge, the need for new skills, emergent courses and academic programmes and how people are interacting with various ICTs in areas such as health.

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Adjusted Count, Complete Count, and Straight Count: Does it Matter when Appraising Research Performance? A Case Study of LIS Research in Post-Apartheid South Africa

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Abstract

Counting of publications and citations is the fundamental yet important technique used in bibliometric/informetric measurements of research performance. Informetricians are however divided on the most appropriate method of counting publications and citations as a means of assessing the authors, institutions and countries' research output and citation impact, respectively. This paper reports on the results generated from a case study of the LIS researchers' output using three methods of publications count, namely, adjusted count (A_c), complete count (C_c) and straight count (S_c). Using data extracted from the Library, Information Science and Technology Abstracts (LISTA) database, the study found that there are differences in the number of articles generated in each counting method per author, as well as in the authors' rankings. The study concludes that in informetric studies, the method of counting chosen for purposes of assessing the performance of researchers matters as each method produces different results. The study recommends that the choice of the counting method should largely depend on the purpose for which the informetric study is being conducted.

Keywords

Adjusted Count, Complete Count, Straight Count, Bibliometrics, Informetrics, Research, South Africa, Publications Count

Introduction

Broadly speaking, bibliometric/informetric studies are largely based on the counting of publications and citations as indicators of research production and impact, respectively. Publications count is the most commonly used method to measure or assess individuals', institutions' and/or countries' research output while citations count reflects one's influence within a specific subject field or discipline. Its flaws notwithstanding, publications count is a widely accepted measure of:

- The number of publications, citations, books, patents, etc, that a particular author, group of authors, institutions and/or countries/geographic regions produced.
- How much has been produced on a given topical issue, discipline, country, regional area, etc.
- The number of publications that have each been authored by a given number of authors.
- The number of publications published in a given source (journal, magazine, etc.) (Victoria, n.d.).

Whereas the above mentioned issues may seem easy and straightforward to determine, the reality of the matter is that the current trends in research wherein research collaboration is increasingly becoming popular among researchers thereby leading to increased co-authorship of publications, crediting authors (including institutions

and countries) with a given number of outputs becomes a complex process. Although evaluating research output of single authorship – in which case authorship can be individual or corporate – seems to be straightforward, multiple-authorship of publications poses major challenges. For instance, who among the multiple authors should be credited with what share of contribution to the authorship of a given publication? Does a co-authored paper (or co-published research) imply equal participation of the authors (or researchers)? As early as 1982, Long and McGinnis, too, wondered thus: "if more than one scientist contributes to the authorship of a single paper, should each author be allocated full credit for the paper or should the credit be distributed among the co-authors in some fashion (Long and McGinnis, 1982)"? Which counting method is the most suitable for crediting authors with specific number of publications? Who cares or should care if one or the other method of counting is used to measure research productivity of scientists?

According to Borgman & Furner (2002), Diodato (1994) and Holden, Rosenburg & Barker (2005), there are three main approaches that can be used to count an author's publications output, namely: adjusted, complete (or normal) and straight count. As Gauffriau, et.al. (2007) point out, there is close to consensus about the above mentioned three counting methods. Whereas in the adjusted count approach, every author is allotted an equal fraction of a unit, a complete count approach ensures that each author is fully counted "whenever he/she appears, whether or not there is multiple authorship" (Diodato, 1994). In the straight count approach, only the first listed author is counted, thereby excluding all the other authors in multiple-authorship. On his part, Larsen (2007) outlines a total of 44 different names for the counting methods. Some of these names are used interchangeably in the literature surveyed by Larsen (2007. In his analysis of the publications output of selected countries, Larsen (2007) adopted five approaches of counting publications, namely complete counting, complete normalised counting, straight counting, whole counting and whole normalised counting. The main difference between counting publications for individual authors, on the one hand, and countries or institutions, on the other hand, according to Larsen, lies in the fact that whereas in the author's affiliation field of a given record, the name of a country or institution can be listed several times; authors are usually listed once thereby necessitating the use of different approaches to counting publications produced by any given country.

It has been argued that different counting methods for publications give different results (Gauffriau, Larsen, Maye, Roulin-Perriard and von Ins, 2007). Perhaps, that is why several writers have written to discredit one or the other of these methods of counting and therefore implying that there is no consensus on what constitutes the best method of gauging a given entity's publications output. Nevertheless, bibliometric/informetric studies that have been conducted to measure publication and/or citation counts of particular authors, institutions, and even countries have used one or more of these methods to assess research output and impact. Although all bibliometric studies employ one or more of the counting methods, it has been observed, sadly, that not all bibliometric studies provide details of the counting method chosen by bibliometric/informetric scholars (Larsen, 2008). In his analysis of the state of the art in publication counting in the ISI (Institute for Scientific Information) proceedings, Larsen (2008) summarises his findings thus:

> The proceedings of the ISSI conferences in Stockholm, 2005, and Madrid, 2007, contain 85 contributions based on publication counting. The methods used in these contributions have been analysed. The counting methods used are stated explicitly in 26 contributions and can be derived implicitly from the discussion of methods in 10 contributions. In only five contributions, there is a justification for the choice of method. Only one contribution gives information about different results obtained by using different methods. The non-additive results from whole counting give problems in the calculation of shares in seven contributions, but these problems are not mentioned. Only 11 contributions give a term (terms) for the counting method(s) used.

Gauffriau & Larsen (2005) underscore the importance of making the right choice of a publications and citations counting method by stating thus: "for all rankings of countries research output based on number of publications or citations compared with population, GDP, R&D and public R&D expenses, and other national characteristics the counting method is decisive". In view of this, the authors recommend that the counting methods employed for purposes of evaluating authors', institutions' and/or countries' research performance should be explicitly stated and explained. Gauffriau & Larsen (2005) underscore the importance of making the right choice of a publications and citations counting method by stating thus: "for all rankings of countries research output based on number of publications or citations compared with population, GDP, R&D and public R&D expenses, and other national characteristics the counting method is decisive". In view of this, the authors recommend that the counting methods employed for purposes of evaluating authors', institutions' and/or countries' research performance should be explicitly stated and explained.

Larsen (2008) summarises the research problem that is being investigated in this study thus:

> "The large increase in publication and citation counting has not resulted in generally accepted methods based on precise definitions. On the contrary, there is a lack of knowledge about the properties of different methods and about the size of the differences in figures obtained by using different methods."

Hence, this study employs an informetric analysis approach to measure selected South African LIS (Library and Information Science Studies) researchers' publications output using the three techniques, i.e. adjusted, complete and straight count in order to find out respective variations in the rankings of the researchers as well as their research outputs based on different counting techniques. Specifically, the study seeks to answer the question: what difference does it make if any of the three methods of publications count was used to measure research output of a given entity, particularly in the case of multiple authors?

Methods and Materials

Data was extracted from the LISTA (Library, Information Science and Technology Abstracts) database. The database is one of the largest bibliographic subject-specific databases, which index the literature on Library and Information Science (LIS). The database covers the literature published on such topics as librarianship, classification, cataloguing, bibliometrics, online information retrieval, and information management, among others.

In order to extract relevant data for the current study, a uniform search query [AF "South Africa"], where AF refers to the author's address field, was applied. The author's field contains such information as the name of the author, the department or section to which the author is affiliated, as well as the institutional and country of origin. The application of the search query was meant to yield all documents containing the name South Africa in the author's field, thereby yielding all documents published by authors with affiliations in South African institutions. The bibliographic data for all papers published by each author was extracted and saved in Micsoft Excel worksheets for further analysis. The search was limited to 'articles' in 'academic journals' published between 1995 and 2009. A total of 514 records were obtained and analysed. Data was cleaned using Notepad text editor. For instance, variations in author names such as Ocholla, D; Ocholla, DN; and Ocholla, ND were standardised in order to yield accurate results.

Descriptive statistics and correlation tests were conducted in order to compare the results generated using the three approaches of publications count. The Pearson moment correlation value was computed in order to test for any difference between the results of the three methods of publications count. The correlation formula was applied to the data, which was arranged in two arrays (columns) depending on the variable being analysed. For instance, the correlation test between the number of papers yielded in the adjusted and straights counts was done by having two arrays (columns) depicting the two sets of data for each author as shown in table 1 wherein *array 1* represents $\mathbf{A}_c$ and *array 2* represents S_c results

Table 1: Example of how Data was Organised for the Pearson Product-Moment Correlation Test

Name	Array 1	Array 2
Ackermann, MF	0.5	1
Addison, T	1	1
Adera, E	0.33	1
Alexander, H	0.33	1
Altman, RB	0.25	1
April, KA	1	1
Ariunaa, L	0.33	1
Arko-Cobbah, A	2	2
Arnold, AM	1	1
Arsenault, C	0.5	1
Averweg, UR	1.33	2
Baard, R	1	2
Badal, S	1	1
Badawi, G	1	1
Bakker, S	0.5	1

The Microsoft Excel's in-built command [=*Pearson (array 1, array 2)*] was applied to the data to produce the *Pearson Product-Moment Correlation Coefficient* [PPMC] (denoted by *r*). Developed by Karl Pearson in the 1880s, the coefficient, which gives a value between +1 and -1 inclusive, is widely used in the sciences as a measure of the strength of linear dependence between two variables (x and y) (Wikipedia, 2012). The test can be used to examine whether or not changes affecting one variable negatively or positively affect the other. In this study, the test was applied in two instances, namely, the number of articles and rank of authors in the three methods of counting. In the first instance the author sought to examine whether or not the changes in the authors' total number of publications determined using one counting method relates in any way with those counted using the other method of counting. The second instance took into consideration the ranking of authors in the three counting methods according to the number of publications. In order to rank the authors, the Excel ranking procedure was followed wherein the output for each author was arranged in columns and executing the following command:

= RANK(number, ref, [order])

where

number is the number whose rank we wanted to find
ref was an array of, or reference to, a list of numbers and
order was the number specifying how to rank the *number*

Scope of the Study

As mentioned above, the study was limited to articles, published by authors affiliated to institutions in South Africa, between 1995 and 2009 and as indexed in the LISTA database. The study is also limited in its purpose as it did not focus on measuring the authors', institutional or the country's publications output but, instead, focused on the differences and/or similarities between the counting methods as applied to LIS publications using various techniques.

Results and Discussion

The findings of the study are presented and discussed under the following sub-headings:

- Rank of authors per counting method
- Publications output per author per method of count
- Differences in publications output when benchmarked against the complete count
- Sum total of papers in A_c, C_c and S_c

Rank of Authors per Counting Method

Table 2 provides the names of top ranking authors and their different ranks in each method of publications count. Whereas Ocholla DN leads the pack in $\mathbf{A_c}$ and $\mathbf{C_c}$, he is ranked in position 5 in S_c. Ranking first in S_c is Onyancha, O.B. followed by Fourie, I., Ngulube, P. and Lor, P.J. An examination of the composition of the top twenty authors in each category reveals that except for Fourie, I. who maintained her position in all the categories, all the authors ranked variously in each counting method.

Table 2: Rank Comparison of the top 20 authors in A_c, C_c, and S_c

Name	*Rank in A_c*	*Name*	*Rank in C_c*	*Name*	*Rank in S_c*
Ocholla, DN	1	Ocholla, DN	1	Onyancha, OB	1
Fourie, I	2	Fourie, I	2	Fourie, I	2
Onyancha, OB	3	Onyancha, OB	3	Ngulube, P	3
Ngulube, P	4	Britz, JJ	3	Lor, PJ	3
Britz, JJ	5	Ngulube, P	5	Ocholla, DN	5
Lor, PJ	6	Lor, PJ	6	Minishi-Majanja, MK	6
van Brakel, PA	7	Minishi-Majanja, MK	6	Raju, J	6
du Toit, ASA	8	van Brakel, PA	8	Dick, AL	6
Minishi-Majanja, MK	8	du Toit, ASA	8	Mutula, SM	6
Dick, AL	10	Stilwell, C	10	Britz, JJ	10
Raju, J	11	Raju, J	11	Nassimbeni, M	11
Stilwell, C	12	Bothma, TJD	11	de Jager, K	11
Pouris, A	13	Dick, AL	13	Pouris, A	11
Mutula, SM	14	Nassimbeni, M	13	Penzhorn, C	11
Nassimbeni, M	14	Snyman, MMM	13	Raju, R	11
Bothma, TJD	16	Snyman, RMM	16	Okello-Obura, C	11
Theron, JC	17	Ikoja-Odongo, JR	16	Stilwell, C	17
Mostert, BJ	18	Mutula, SM	18	Ikoja-Odongo, JR	17
Snyman, MMM	18	Mostert, BJ	18	Mostert, BJ	17

A Pearson Product-Moment Correlation (PPMC) test yielded the following coefficients: r=0.585259 (between $\mathbf{A_c}$ and $\mathbf{C_c}$); r=0.548593 (between $\mathbf{A_c}$ and S_c); and r=0.356181 (between $\mathbf{C_c}$ and S_c). Although the coefficients indicate some form of correlation between the different counting methods, they nevertheless reveal a weak relationship among the variables. This is further reinforced by the differences witnessed in the rankings of individual authors in each counting category. For instance, some authors who did not make it to the top twenty in the first category of authors (A_c) emerged among the top ranked authors in C_c. These include Snymann, R.M.M., and Ikoja-Odongo, R. This could imply that these authors published most of their papers through co-authorships, which may have reduced their total number of publications/units when adjusted count was used to measure their output.

There were also those authors who featured in the list of top ranking authors in the $\mathbf{A_c}$ but did not feature in the $\mathbf{C_c}$ list. They include Theron, J.C. and Pouris, A. Ordinarily, authors should be highly ranked in the $\mathbf{C_c}$ than in $\mathbf{A_c}$ but these two authors, just as other authors, were not ranked any higher in the $\mathbf{C_c}$. This may be caused by the fact that whereas other authors heavily co-authored their papers, hence their lower ranking in $\mathbf{A_c}$, the same may have performed much better in the $\mathbf{C_c}$ category thereby overshadowing the two authors. Likewise, there were authors who featured among the top twenty in the $\mathbf{C_c}$ list but did not feature in the S_c list. They are van Brakel, P.A., du Toit, A.S.A., Bothma, T.J.D., Snymann, M.M.M. and Snyman, R.M.M. This simply means that the authors' names were not listed the first, among the collaborators, in the papers. Those who featured among the 20 top authors in the S_c list

but not in the $\mathbf{C}_c$ include de Jagger, K., Pouris, A, Penzhorn, C., Raju, R. and Okello-Obura, C. These authors' names were largely listed first in the names of authors.

Publications Output per Author per Method of Count

This section deals with the ranking and comparison of the authors and their publications output using the three methods of counting. Table 3 provides the names of the top ranking 20 authors and their publications output between 1995 and 2009. The pattern depicted in the table reveals that there were glaring differences in the number of papers each author was credited with in each category of publications count. This pattern was witnessed among the majority of authors. In table 3, for example, Ocholla, D.N., who ranked the first in $\mathbf{A}_c$ and $\mathbf{C}_c$, produced 19.66 ($\mathbf{A}_c$), 33 ($\mathbf{C}_c$) and 11 (S_c). An analysis of the publication pattern, according to the counting method, especially in situations where the authors published three or more articles, produced similar results as those recorded by Ocholla, D.N., wherein the complete count yielded the highest number of articles published by the authors.

It was also revealed that authors who collaborated heavily yielded fewer publications in $\mathbf{A}_c$ than in $\mathbf{C}_c$. Furthermore, most authors' output, measured using the S_c method, was much less than their total number of papers in the S_c. For example, out of 33 publications produced by Ocholla, D.N., only 11 contained his name as the first author, accounting for 33.3%. The other authors' publications output in terms of the number of papers containing their names as the first authors, expressed as a percentage of the number of papers in which their names appeared was as follows: Fourie, I. (81%), Onyancha, O.B. (90%), Ngulube, P. (63%), Britz, J.J. (30%), Lor, P.J. (80%), van Brakel, P.A. (21%), du Toit ,A.S.A. (21%), Minishi-Majanja, M.K. (47%), Dick, A.L. (78%), Raju, J. (70%), Stilwell, C. (33%). A further analysis of the results in the three categories of counting through a PPMC yielded the following coefficients: r=0.968581 (between $\mathbf{A}_c$ and $\mathbf{C}_c$); r=0.882788 (between $\mathbf{A}_c$ and S_c); and r=0.818427 (between $\mathbf{C}_c$ and S_c). The high values imply a strong positive relationship between the variables under investigation in this study.

Table 3: Number of Individuals With X Number of Papers in Each Counting Method

	Ranked by A_c				Ranked by C_c				Ranked by S_c		
Name	**A_c**	**C_c**	**S_c**	**Name**	**A_c**	**C_c**	**S_c**	**Name**	**A_c**	**C_c**	**S_c**
Ocholla, DN	19.66	33	11	Ocholla, DN	19.66	33	11	Onyancha, OB	14	20	18
Fourie, I	15.5	21	17	Fourie, I	15.5	21	17	Fourie, I	15.5	21	17
Onyancha, OB	14	20	18	Onyancha, OB	14	20	18	Ngulube, P	12.49	19	12
Ngulube, P	12.49	19	12	Britz, JJ	9.9	20	6	Lor, PJ	9.08	15	12
Britz, JJ	9.9	20	6	Ngulube, P	12.49	19	12	Ocholla, DN	19.66	33	11
Lor, PJ	9.08	15	12	Lor, PJ	9.08	15	12	Minishi-Majanja, MK	7.66	15	7
van Brakel, PA	7.83	14	3	Minishi-Majanja, MK	7.66	15	7	Raju, J	7.42	10	7
du Toit, ASA	7.66	14	3	van Brakel, PA	7.83	14	3	Dick, AL	7.5	9	7
Minishi-Majanja, MK	7.66	15	7	du Toit, ASA	7.66	14	3	Mutula, SM	5	7	7
Dick, AL	7.5	9	7	Stilwell, C	7.24	12	4	Britz, JJ	9.9	20	6
Raju, J	7.42	10	7	Raju, J	7.42	10	7	Nassimbeni, M	5	9	5
Stilwell, C	7.24	12	4	Bothma, TJD	4.99	10	1	de Jager, K	4	7	5
Pouris, A	5.3	6	5	Dick, AL	7.5	9	7	Pouris, A	5.3	6	5
Mutula, SM	5	7	7	Nassimbeni, M	5	9	5	Penzhorn, C	3.16	5	5
Nassimbeni, M	5	9	5	Snyman, MMM	4.16	9	2	Raju, R	2.25	5	5
Bothma, TJD	4.99	10	1	Snyman, RMM	4.16	8	1	Okello-Obura, C	1.33	5	5
Theron, JC	4.5	5	4	Ikoja-Odongo, JR	3.5	8	4	Stilwell, C	7.24	12	4
Mostert, BJ	4.16	7	4	Mutula, SM	5	7	7	Ikoja-Odongo, JR	3.5	8	4
Snyman, MMM	4.16	9	2	Mostert, BJ	4.16	7	4	Mostert, BJ	4.16	7	4

Authors' Publications Difference Benchmarked against the Complete Count

This section attempts to offer an alternative approach to answer the study's broad question: does it matter which method of counting the publications is used to measure researchers' output? Specifically, the approach seeks to answer the question: by how much is the total number of publications per author affected (i.e. reduced)? The emphasis is to benchmark the other counting methods ($\mathbf{A_c}$ and S_c) against the complete count, which often yields the most number of publications for any given unit of analysis, i.e. author, institution, or country.

Taking the complete count, therefore, as the benchmark or point of reference (i.e. the total number of publications output per individual), the biggest difference between $\mathbf{C_c}$ and S_c in terms of the percentage reduction was recorded by Bothma, T.JD. (900%), followed by Snyman, R.M.M. (700%), van Brakel, P.A. (366.67%), du Toit, A.S.A. (366.7%), Snyman, M.M.M. (350%), van der Walt, T.B. (300%), Britz, JJ (233.33%), and Ocholla, DN (200%). In terms of the difference between the $\mathbf{C_c}$ and the $\mathbf{A_c}$ for each author, the number of publications for Cuyers L, de Pesmacker, P., Jegers, M., Viviers, W., Saayman, A., declined by 600% each while 500% was forfeited by Chetty S and Shongwe B. The following authors' number of publications declined by 400% each in the S_c category: Ncayiyana D, Packer, A., Pakenham-Walsh, N., Cohen, B. and Godlee, F. Table 4 reveals this pattern for the 40 top ranking authors.

Triangulating the findings in table 4 by assessing the number of authors whose output was reduced by x number and/or percentage of publications when the $\mathbf{A_c}$ and S_c methods were applied resulted in figures 1 and 2, respectively. Fig 1 reveals that 88 and 248 authors' total publications in the $\mathbf{C_c}$ reduced by nil (0) publications in $\mathbf{A_c}$ and S_c respectively. Simply put, irrespective of the method used, 88 and 248 authors' output will not be affected if the $\mathbf{A_c}$ and/or S_c method was used, respectively. However, a closer examination, of these authors revealed that they singly produced between 1 and 3 papers each; majority of them singly produced 1 paper each. The percentage reduction of publications per a given number of authors in $\mathbf{A_c}$ and S_c respectively was as follows: between 1% and 100% (60, 20); between 100% and 200% (196, 22); between 200% and 300% (70, 8); and between 300% and 400% (29, 4). There were a total of 153 authors who lost all their publications when the straight count was used to measure their output. Simply put, the 153 authors' names were not listed as the first author in the papers wherein their names appeared as authors.

Table 4: Reduction of authors' publications when benchmarked against the C_c total

Name	C_c minus A_c		C_c minus S_c		Name	C_c minus A_c		C_c minus S_c	
	Count	*%*	*Count*	*%*		*Count*	*%*	*Count*	*%*
Ocholla, DN	13.34	67.85	22	200.00	Cloete, LM	5.01	251.76	7	-
Fourie, I	5.5	35.48	4	23.53	Pouris, A	0.7	13.21	1	20.00
Onyancha, OB	6	42.86	2	11.11	Penzhorn, C	1.84	58.23	0	0.00
Britz, JJ	10.1	102.02	14	233.33	Raju, R	2.75	122.22	0	0.00
Ngulube, P	6.51	52.12	7	58.33	Okello-Obura, C	3.67	275.94	0	0.00
Lor, PJ	5.92	65.20	3	25.00	Theron, JC	0.5	11.11	1	25.00
Minishi-Majanja, MK	7.34	95.82	8	114.29	Jacobs, D	1.67	50.15	2	66.67
van Brakel, PA	6.17	78.80	11	366.67	Weideman, M	2	66.67	2	66.67
du Toit, ASA	6.34	82.77	11	366.67	Eloff, JHP	2.67	114.59	5	-
Stilwell, C	4.76	65.75	8	200.00	Leach, A	3.18	174.73	5	-
Raju, J	2.58	34.77	3	42.86	Swanepoel, A	0	0.00	0	0.00
Bothma, TJD	5.01	100.40	9	900.00	Meyer, HWJ	0.5	14.29	0	0.00
Dick, AL	1.5	20.00	2	28.57	Steyn, C	0.5	14.29	0	0.00
Nassimbeni, M	4	80.00	4	80.00	Fairer-Wessels, FA	1	33.33	0	0.00
Snyman, MMM	4.84	116.35	7	350.00	Thomas, GG	1	33.33	0	0.00
Ikoja-Odongo, JR	4.5	128.57	4	100.00	Ondari-Okemwa,E	1.5	60.00	1	33.33
Snyman, RMM	3.84	92.31	7	700.00	du Plessis, T	2	100.00	1	33.33
Mutula, SM	2	40.00	0	0.00	Kiplang'at, J	2.17	118.58	1	33.33
de Jager, K	3	75.00	2	40.00	Machet, MP	0.5	14.29	2	100.00
Mostert, BJ	2.84	68.27	3	75.00	Underwood, PG	1	33.33	2	100.00

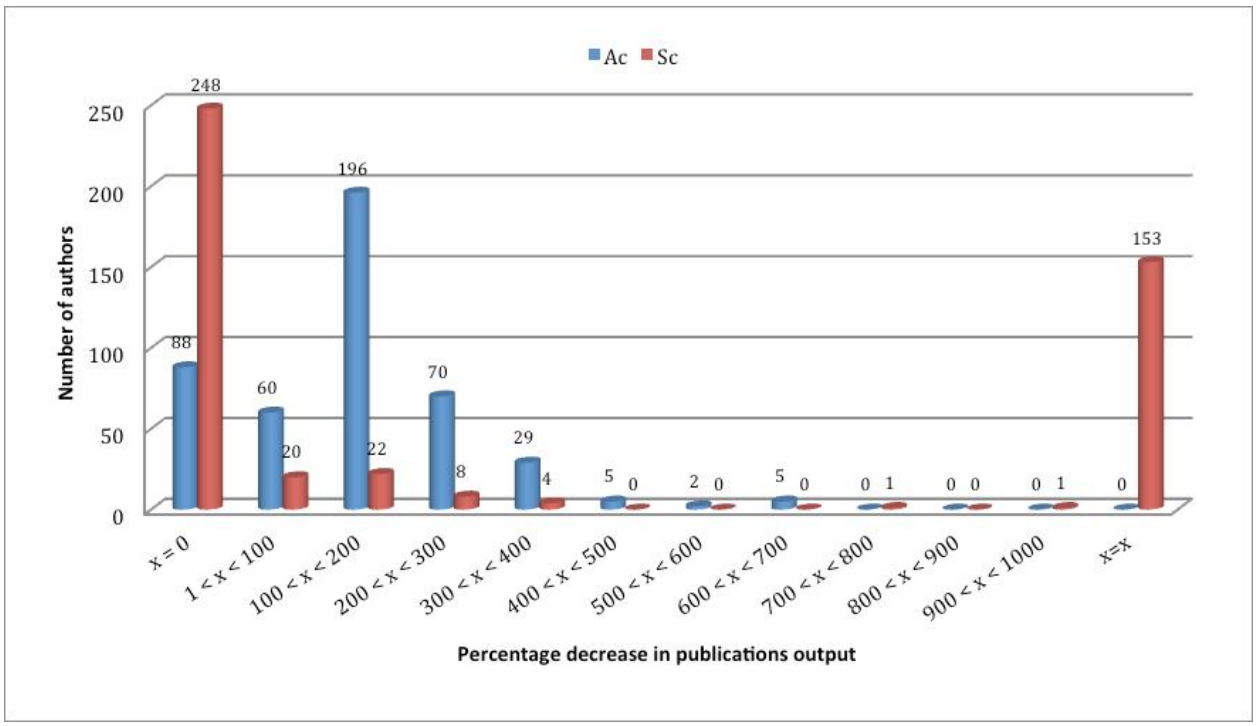

Fig 1: The number of authors with x percentage reduction of publications

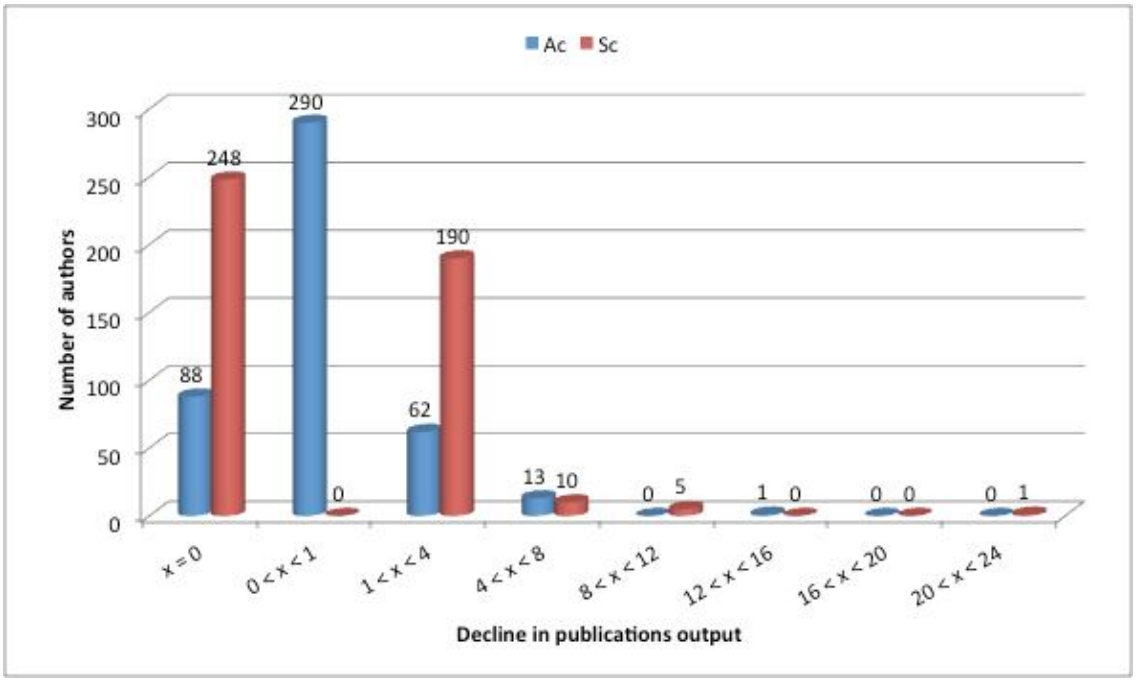

Fig 2: The number of authors with decline in x number of publications

As regards the number of papers that the x number of authors lost when $\mathbf{A_c}$ and S_c were respectively applied, it was as follows: between 0 and 1 publications (290, 0); between 1 and 4 (62, 190); between 4 and 8 (13, 10); between 8 and 12 (0, 5); between 12 and 16 (1, 0); and between 20 and 24 publications (0, 1). The highest number of papers (i.e. 22 papers) lost by a single author was recorded in the straight counting method.

Aggregation of Papers in $\mathbf{A_c}$, $\mathbf{C_c}$ And $\mathbf{S_c}$

Supposing the counting of papers using the three methods as applied to the single unit of analysis (i.e. the author) was aggregated to measure a corporate unit's (e.g. institution or country) output, what would be the difference? In other words, what if the author wanted to sum up all papers produced by the total number of authors in each method of counting publications in order to measure a country's total publications output? Using the data obtained for study adjusted count would yield a sum total of 517.8 publications in LIS research output in South Africa between 1995 and 2009 while the total number of publications produced using complete count and straight count would be 878 and 514 respectively. Ordinarily, $\mathbf{A_c}$ and S_c should yield an equal number of publications for a corporate unit of measurement (i.e. institution or country) but given that the values generated in $\mathbf{A_c}$ are often expressed in fractions (in this case expressed as a two-decimal point value), some units are lost in the process. For example, in the case where three authors have published an article, their individual contribution (output) is 0.33. If we reverse these individual contributions to the whole unit by multiplying the 0.33 of a unit that is contributed by each author by 3 authors, we will arrive at 0.99 of a whole unit that was initially split among the three authors.

This result does not represent the whole unit, which was shared among the three authors. Nevertheless, it can be deduced that whereas the complete count will exaggerate the total number of publications by country or institution when using the authors' total publications, the adjusted count and straight count methods will produce a near perfect (if not perfect) reflection of the unit's research output. However, one does not have to assess a country's or institution's research output by summing up the individual author's publications counts. There are different techniques that have been proposed for purposes of crediting countries with publications (see Gauffriau, Larsen, Maye, Roulin-Perriard & Ins, 2008). Olesen (2007), too, outlines several techniques for counting the publications according to the country of origin, namely: *absolute country counting, first country counting, normal country counting, standard country counting and total country counting*. The same techniques can be used to measure institutional research output.

Conclusions and Recommendations

This article's main focus was to compare the results generated by different publication counting methods, taking the LIS sector in South Africa as a case study. The research question that guided the study was: does it matter which of the three widely used counting methods one uses to count publications? Indeed, the study has revealed and therefore concurs with previously published studies (e.g. Gauffriau, Larsen, Maye, Roulin-Perriard & Ins, 2008) that it matters. However, the main difference is in the amount of research (number of publications – articles or papers) that one would be credited with when each of the counting methods is applied. Whereas the correlation test, as applied to the ranking of authors, yielded low coefficients implying weak correlation between the results of the three counting methods, the correlation test, based on the number of publications, yielded high values indicating a strong relationship. This means therefore that the method of counting matters most when authors are given ranks/positions based on their standing in the three methods. But if the authors' publications are considered to assess their performance in research output, it may not matter which method is applied, as the application of any of the methods would almost equally affect each individual's output, most probably because the pattern of publication (i.e. collaborative or individual-based research) is similar for majority of the authors.

Worth noting, too, was the manner in which majority of the authors' total publications output (based on complete count) was greatly affected when the other two methods (adjusted count and complete count) were applied. It was noted that the number of publications for the majority of the authors were greatly reduced when the $\mathbf{A_c}$ and S_c methods were

used. Some authors' number of publications was reduced as much as by over 500% especially when the S_c method was applied. Whereas the S_c yielded the lowest number of articles for the majority of the authors, the method can nevertheless be applied in informetric studies in such fields as pure sciences, e.g. Biology. As Herbertz and Muller-Hill (cited in Moed 2000) claim, in molecular biology research, the first author's position is given to the scientist who did the main work, and therefore, "when two groups collaborate, the group delivering the first author collects two thirds of the citations, and the second group, one third and in the case of three collaborating groups, the group presenting the first author receives a portion of 0.5, and the other groups, 0.25 each". However, as informetricians may not be privy to the basis upon which authors' names are arranged in a paper, it becomes difficult to credit the first author only for a publication that has been jointly published by more than one author.

Aggregating the results in each method of counting revealed a huge difference between the complete count results, on the one hand, and the straight and adjusted count, on the other hand. As already discussed under aggregation of papers, there were 878 publications in $\mathbf{C_c}$, 517.8 in $\mathbf{A_c}$ and 514 in S_c produced by a total of 455 authors. Therefore, the study found that on average, each author's publications count would be reduced by a margin of 0.79 and 0.80 units when the adjusted and straight count are applied, respectively. This pattern may vary from one study to another depending on the intensity of collaboration (i.e. the number of authors engaged in the publication of an article).

It is in such like circumstances that one could conclude that qualitative approaches, combined with quantitative approaches, may be used to measure each author's contribution to a given paper. For instance, authors may be asked to indicate the percentage of their input into the particular research or co-authorship of publications. The National Research Foundation (NRF) of South Africa uses this approach when rating researchers besides using several other criteria.

An examination of the results also revealed that whereas some authors are not often the first authors, implying that the authors may not be the main researchers, they nevertheless have performed well in their individual capacity, as well as favourably contributed towards the country's research output. It follows that a researcher's output is enhanced not only through the research where he/she is the main researcher but also through collaborative research. Although these authors' publications are greatly reduced when $\mathbf{A_c}$ and S_c methods of counting are applied in the measurement of their research output, the fact that they are among the top producers gives credence to the fact that research collaboration can enhance one's research output and therefore should be encouraged.

In conclusion, the choice of one method or the other for purposes of research performance appraisal of authors should be done based on the objectives of such an appraisal. For instance, if the appraisal is meant to gauge the suitability of a candidate for employment or promotion, the $\mathbf{C_c}$ and $\mathbf{A_c}$ can apply. However, if it is for purposes of rewarding or rating the authors involved in the publication of the papers or conducting the research, then $\mathbf{A_c}$ may be the best-suited method.

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Note: A complete list of the Adjusted, Complete and Straight Counts of Publications Output of LIS Researchers in South Africa is available on request.

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Viewing Higher Education Information Literacy through the African Context Lens

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Abstract

Established models of information literacy education (ILE) which are contextually grounded in Western social and intellectual structures fail to take into account local African contexts. This article argues that in a developing context, the traditional definition of information literacy needs to be adjusted to include an understanding of when information can be used to improve everyday living or to contribute to the solving of problems related to particular situations. This paper adapts cultural contextuality model in ILE to explore considerations for the design of ILE for the African developing context and based on this, proposes possible learning outcomes for ILE in the African higher education context.

Keywords

Information Literacy Education, Higher Education, Africa, African Development

Introduction

Dorner and Gorman (2006) claimed that for information literacy education *(*ILE) to be meaningfully embedded in the educational fabric of a developing country …", "…it is important to take account of a range of contextual variables…". One must understand the impact of local culture on learning in general and information literacy in particular." (Dorner and Gorman, 2011). Higher education ILE, in whatever form needs to take cognisance of the African developing context and address issues related to societal development and individual empowerment.

Dorner and Gorman (2006) have argued that "the prevailing models of information literacy education are contextually grounded in Western social and intellectual structures". For precisely this reason, the author argues, they fail to take into account local African contexts such as: the critical role played by indigenous knowledge as a knowledge and information resource in the lives of the masses in Africa and the importance of awareness information, for example, the need for good nutrition to eradicate infant mortality, that abstinence or protected sex reduces the spread of HIV/Aids, and other information required for everyday survival. It is the "lack of knowledge and lack of awareness" resulting in part from on-going information illiteracy that affects "all aspects of society, including such basic needs as health and nutrition, housing, clean water, a fair income, and so on" (Dorner and Gorman, 2011). Ogunsola et al. (2011) stress that higher education information literacy is "crucial to national and personal development" and that in Africa it is a "major route to overcoming poverty, hunger and disease…". Dorner and Gorman (2008, 2011) postulate that in a developing context, the traditional definition of information literacy (IL) needs to be adjusted to include "understanding when information can be used to improve…daily living or to contribute to the resolution of needs related to specific situations." While the traditional definition of IL may be regarded as technically and pedagogically faultless, it does have limitations for developing contexts such as those in Africa.

The purpose of this article is to, via a conceptual approach, adapt Dorner and Gorman's 'cultural contextuality' model (2006; 2008:2011) in ILE so as to explore considerations for the design of ILE for

the African developing context and based on this, propose possible learning outcomes for ILE in the African higher education (HE) context. This is prefaced by an examination of the Western model of ILE and its limitations in the African developing context.

The Western Model of Information Literacy Education

Higher education information literacy education (ILE) in many parts of the world (including the developing world) has been largely based on the traditional definition of IL developed in the Western world that states:

> Information literacy is set of abilities requiring individuals to recognise when information is needed and [to] have the ability to locate, evaluate and use effectively the needed information (Association of College and Research Libraries (ACRL), 2000).

On a technical and pedagogical level, this definition cannot be faulted. As Dorner and Gorman (2006) point out, IL is no doubt a set of abilities and the concept of information literacy revolves around an information need. The pedagogical outcomes are also clear, that is, to locate, to evaluate and to use, and conform appropriately with Bloom's classic *Taxonomy of Educational Objectives* (Centre for Teaching and Learning, University of North Carolina at Charlotte, 2012) which presents six levels in the cognitive process. This has historically provided the pedagogical framework for most ILE programmes. Accordingly, Bloom's cognitive hierarchy has been the basis of Eisenberg and Berkowitz's (1990) famous "Big Six" skills approach to library and information skills instruction. This is universally used to teach information literacy: task definition (arising from the information need), information search strategies, location and access, use of information; synthesis and evaluation.

Despite these enduring frameworks, which have been pedagogically tried and tested over the years and which have lent credibility to the widely accepted traditional definitions of IL, there have been those who have identified inherent limitations and constraints in these definitions, particularly for developing contexts such as those in Africa.

Limitations of the Western Model of Information Literacy Education in the African Developing Context

Simmons (2005) has challenged the traditional definition of IL by pointing out that "it lacks a critical element" and therefore argues that "helping students to examine and question the social, economic and political context for the production and consumption of information is a vital corollary to teaching the skills of information literacy." Dorner and Gorman (2006) corroborate this by pointing out that "information does indeed exist in a context, and not to understand that is ultimately not to understand information, and thereby fail to use it effectively in knowledge generation."They go on to implode a fallacy among many information professionals that information literacy is about the technical task of collecting information. Dorner and Gorman (2006) see this as being analogous to an aero-plane mechanic collecting pieces of a jet engine and placing them in neat rows. This, for them, does not make a workable jet engine – it is learning how to fit the pieces together that makes a workable engine. Similarly, they argue:

> "It is the construction of meaning from information that has true value … and this is what information literacy must do if it is to be effective, most especially in developing countries, where information is increasingly recognised as a key tool for development" (Dorner and Gorman, 2006).

This critical and constructivist approach, rather than a positivist epistemological view of information (inherent in the Association of College and Research Libraries (ACRL) definition cited earlier), is what will convert information to knowledge in our characteristically post-modern information environment. Hence, Simmons (2005) appeals that in ILE "facilitating students' understanding that they can be participants in scholarly conversations encourages them to think of research not as a task of collecting information but instead as a task of constructing meaning". This clearly resonates with what South Africa's Jonathan Jansen, a respected

higher education specialist and analyst, terms "critical pedagogy" which he uses to emphasise that "theoretical work" can take "its critical meaning from the context in which education was [*sic*] practised" (Jansen, 2009).

The ACRL definition, widely accepted in Western countries as a standard guide to what is meant by "information literacy" (Dorner and Gorman, 2006), explains IL as a set of measurable skills (including to locate, evaluate, use). Noorgaard (2004) cautions that in such a model there is the risk of information literacy being "reduced to a neutral, technological skill that is seen as merely functional or performative". Instead of this functional approach, argues the author, IL education should rather assume a "critical pedagogy" mantle and teach HE students how to qualitatively integrate and evaluate information within complex sites of practice and communication structures, thus imparting to them skills in knowledge construction, a key HE imperative. Likewise, Noorgaard (2004) denounces the "skills-based paradigm that surely continues to haunt information literacy" and calls for IL to be "conceived of as a process-oriented literacy" which would locate it in a "better position to communicate its inherent intellectual vitality and larger social and ethical relevance".

It is this "social and ethical relevance" that has serious implications for the African development context. Knowledge emanating as a social construct of 'process-oriented information literacy' has a critical role to play in the African growth, development and innovation continuum. Knowledge is a key strategic resource and lifeline for sustainable development in Africa (Ahmed, 2007). Shanbhag (2006) emphasises that knowledge may be produced when ordinary people make sense of their world and that this knowledge is based on their experiences as they construct methods and processes to cope with situations facing them. While developed countries have made advances in achieving their Millennium Development Goals (MDGs), a large number of developing countries, particularly in Africa, have not even got out of their starting blocks – they are plagued by poverty and hunger, high death rates due to disease, poor education systems, high infant mortality rates, the HIV/Aids pandemic, ethnic conflicts, high debt burdens and weak governance structures often gripped by corruption (Forsyth, 2005; Casal, 2007). In such a context, access to information/ knowledge is critical, especially for young people, and hence higher education ILE models in Africa need to be conceptualised to include the "social and ethical relevance" which Noorgaard (2004) refers to.

While the scholars of IL (Breivik and Gee (1989); Eisenberg and Berkowitz (1990); Kuhlthau (1991); and others) no doubt had noble intentions when they expounded their theories and over the decades significantly influenced ILE all over the world, the reality is that their theories have been grounded in Western social and intellectual structures and, not surprisingly, show 'fault-lines' when applied particularly to developing contexts. Their 'objectifying' of information has been criticised by Luke and Kapitzke (1999:483) who claim that it has allowed information literacy educators to ignore the social construction and cultural authority of knowledge, the political economies of knowledge ownership and control, and the development of local communities' and cultures' capacities to critique and construct knowledge.

If one broadly views culture, as this paper does, as a system of knowledge shared via social learning by a group of people usually located in a particular geographic area, then information and culture cannot be separated. Yeh (2007), in studying the information behaviour of Taiwanese aboriginal tribes, relevantly observes that information is "not processed objectively but rather interpreted through expectations about life experience." It is embedded in the fabric of a people's daily life and constructed through participation in life's daily activities, personal or work related. Information in the context of this broad notion of culture has implications for the developing societies of Africa. It for this reason that Dorner and Gorman (2006, 2011) advocate that the very functional, reductionist and skills-based traditional definitions of information literacy need to be operationalised to include robust qualitative aspects so that ILE, particularly in developing contexts where information is key to development, can teach individuals to recognise the social construction and cultural authority of knowledge. According to Dorner and Gorman (2006), ILE models based on this more robust definition of IL must make individuals intimately familiar with the political economy of knowledge ownership and control, and this will determine their ability to access and understand information/

knowledge throughout life…information literacy in developing countries in particular must involve the development of capacity within local communities and local cultures to critique existing knowledge found by means of effective information literacy and to construct new knowledge on the basis of this critique.

Hence Dorner and Gorman (2006) propose the following operational definitions of IL for developing contexts, the ability of individuals or group to:

- be aware of why, how and by whom information is created, communicated and controlled, and how it contributes to the construction of knowledge.
- understand when information can be used to improve their daily living or to contribute to the resolution of needs related to specific situations, such as at work or school.
- know how to locate information and to critique its relevance and appropriateness to their context.
- understand how to integrate relevant and appropriate information with what they already know to construct new knowledge that increases their capacity to improve their daily living or to resolve needs related to specific situations that have arisen.

Intehration of 'Cultural Contextuality' into Information Literacy Education

Dorner and Gorman's (2006, 2008, 2011) context-based and constructivist approach to IL, and hence to ILE, goes on to delve into the pedagogical difficulties of using Bloom's cognitive hierarchy as a rigid template for developing information literacy educational taxonomies grounded in local cultural understandings, by comparing learning styles in different cultural contexts. This, however, is not the focus of this article. Rather, it draws from this useful 'cultural contextuality' emphasis to explore considerations for the design of ILE for the African development context.

Earlier, the author pointed out that ILE models grounded in Western contexts fail to take into account local African realities such as the critical role of indigenous knowledge as a knowledge and information resource in the lives of the masses in Africa; or for that matter, the importance of awareness information, for example, the need for good nutrition to eradicate infant mortality, that abstinence or protected sex reduces the spread of HIV/Aids, the importance of irrigation for healthy crop growth, and other information required for everyday survival – issues that are largely irrelevant to developed contexts. Dorner and Gorman (2008, 2011) themselves emphasise the role of indigenous knowledge (local knowledge that is unique to a particular culture or society) in teaching and learning contexts. They posit that students are able to learn more deeply from practice or real life, citing as an example a geography teacher in a rural school in Laos (southeast Asia) incorporating forest conservation into his teaching and learning as students can learn from elders in the community about how to conserve the forest. Similarly, moral behaviour (reciprocal teacher-student respect, respect for each other, respect for the environment, etc.) is taught by bringing traditional Lao culture into the classroom. Hence, when assisting students to understand IL and when developing ILE, educators and librarians in the African context need to "realise the vital importance of understanding the local context" (Dorner and Gorman, 2008, 2011). It is necessary to creatively incorporate Africa's rich indigenous cultures into teaching and learning content and methods – for example, teaching methods incorporating the collectivist (as opposed to individualistic) nature of many African societies. Dorner and Gorman (2008; 2011) claim that an ILE programme sensitive to these considerations would lead to growth in self-confidence of teachers and/or librarians, as well as the students which in turn would lead to critical thinking and then to independent thinking. Increased innovation, the result of improved problem solving, they explain, would "lead to national development and improved living conditions for individuals and the country as a whole" – the 'twin notions' of societal development and individual empowerment referred to at the outset of this article as being key to policy statements for African development.

This article proposes a model for ILE that draws from the strengths of the Western model of ILE (the value of these should not be denied) but which also, drawing from Dorner and Gorman's context-based definition (2006), incorporates, for local African societal development and individual

empowerment, concepts relating to:

- understanding the political economy of knowledge ownership and control so as to be able to access and understand information/ knowledge and its contribution to the social construction of knowledge;
- understanding when information can be used to improve everyday living or to finding solutions to specific situations;
- developing capacity within local communities and cultures to be able to critique the contextual relevance and appropriateness of knowledge that has been accessed and based on this, to construct new knowledge that may be used to improve daily living and resolve problems related to specific situations.

Mokhtar et al. (2009), interrogating the relevance of ILE in Singapore, appeal that the IL curriculum package cannot simply adopt the existing IL standards that have been used in various developed countries such as the US, UK or Australia, without considering the unique multi-ethnic and multi-cultural setting of Singapore.

They too believe that Eisenberg and Berkowitz's (1990) "Big Six" ILE model is short on the "social and ethical relevance" of IL, which Noorgaard (2004) poignantly referred to, as well as other aspects relevant to the Singapore context; and proceed to present an ILE model (Mokhtar et al. 2009) that takes into account contextual variables.

Learning Outcomes for ILE in the African Higher Education Context

The need in the African developing context to balance learning outcomes associated with 'traditional' IL competencies with those that speak to context-based IL competencies. It is shown in the table. It is such an active interaction of positivist and constructivist epistemologies in the learning outcomes that is likely to ensure that African higher education ILE makes a meaningful contribution to the 'twin notions' of African societal development and individual empowerment referred to earlier. In recognising that within Africa itself there are many contextual differences, it is hoped that what is presented in this article would serve as a basic framework to guide the design of ILE oriented to local contextual variables in the different African contexts.

Table 1: Learning outcomes for ILE in the African HE context

Learning outcomes for 'traditional' IL competencies (positivist orientation)	**Learning outcomes for context-based IL competencies (constructivist orientation)**
The student is able to: • identify an information need and the extent of this need related to the defined task, • adopt strategies (including ICT related strategies) to search for potential sources of the information required, • locate information sources (print, electronic, or otherwise) as well as access the required information, efficiently and effectively, • select and evaluate information content for the defined task, • extract, organise/restructure, and create new information/knowledge, • understand the legal and ethical issues related to information use and is able to use the information responsibly; and • critically evaluate the information search process, as well as the end product .	The student, in a particular African context, is able to: • analyse why, how and by whom information is created, communicated and controlled, and how it contributes to the construction of knowledge in that context, • find out when information can be used to improve daily living or to contribute to the resolution of problems related to specific situations, • critique the relevance and appropriateness of located information to that particular context; and • integrate relevant and appropriate information into an existing knowledge base to construct new knowledge that leads to increased capacity to improve daily living or to contribute to the resolution of problems related to specific situations.

Conclusion

This article has drawn from Dorner and Gorman's 'cultural contextuality' model (2006; 2008; 2011) in ILE to learning outcomes for higher education ILE in the African developing context. There is no doubt that there are limitations of the traditional Western grown model of ILE for the African developing context, but this does not deny the inherent values of the 'traditional' IL competencies. Rather, what is proposed here enriches the application of 'traditional' IL competencies to the African developing context by complementing them with context-based IL competencies to produce a rich mix of positivist and constructivist learning outcomes so that African higher education ILE may meaningfully contribute to African societal development and individual empowerment. It is hoped that what is proposed in this article would set in motion field research delving into specific cultural contexts in Africa so that concrete case studies, as Dorner and Gorman (2006; 2008; 2011; 2012) have done in the Asian region, would reveal more grounded theory relating to higher education ILE in the African developing context.

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Information Literacy Delivery in Nigerian Primary Schools: A Case Study of Enugu State, Nigeria

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Abstract

This paper discusses the findings regarding information literacy (IL) delivery in primary school libraries in Enugu State, Nigeria. The discussion is based on IL content and delivery methods, as well as their effectiveness. The study was an instrumentation research in which experiment was used to test effect of a developed IL curriculum. In order to ascertain the effect of the curriculum, pre-test was given to the whole subjects prior to the commencement of the teaching. Subjects, received teaching covering the whole topics for second term-a period of 12 weeks. A post- test was thereafter given and the hypothesis tested was that: There is no significant difference between the information literacy skills of pupils participating in library period programme and those not participating, The hypothesis was tested using t- test statistics. The study made use of mean score, standard deviation and charts to present and analyse data. Observations showed that pupils exhibited tremendous development as regard their literacy and communication skills, library use skills, and critical thinking skills during the cause of the treatment. The study also found that pupils taught with library period curriculum did significantly better in the project given than those not taught. It was therefore concluded that the library period programme (LPP) might have been responsible for the higher performance of the experimental group. This had some implications for educational policy makers, school administrators, school librarians and class teachers. It was therefore recommended that all stakeholders need to promote information literacy in order to make pupils lifelong and comfortable learners.

Keywords

Information literacy, IL delivery methods, Evaluation, School libraries, Nigeria

Introduction

Information literacy is a vital skill for everyone, particularly children in this information age. It is the pivot on which their development rests. To be independent learners and knowledge seekers in future, there is need for children to be equipped with information literacy skills. There is need to be able to access, interpret, evaluate and communicate information in different ways. Information literacy provides opportunities that will help them to become critical thinkers, users of information, as well as lifelong learners. This is why the Association of College and Research Librarians (ACRL) (2000) emphasises that people are information literate when they, among other things, access information efficiently and effectively; evaluate information critically and competently; use information creatively; appreciate and enjoy literature and other creative expressions; strive for excellence in information seeking and knowledge generation; and participate effectively in groups to pursue and information.

According to Nghiem (2010), the notion of IL was understood as a tool for dealing with information explosions and individuals' need for using information

resources in their problem solving situation. The concern of how to communicate, generate, process, and exchange information is prioritised in the context of network and information-filled society. The importance of information literacy cannot therefore be overemphasised. Rockman (2004) notes that "individuals who are knowledgeable about finding, evaluating, analysing, integrating, managing and conveying information to others efficiently and effectively are held in a high esteem". This set of people become successful at solving problems, as well as producing new ideas and directions for the future. In other words, they are lifelong learners. With information literacy skills, people can be active users and creators of information rather than passive receivers (UNN. Department of Library and Information Science, 2007).

The National Policy on Education (Nigeria, 2004) has as its aim to inculcate the spirit of enquiry and creativity, to lay a sound basis for scientific and reflective thinking and in bringing up a generation of people who can think for themselves. Again, it stipulates as its objective for setting up primary education the need for acquisition of literacy skills. Thus, Dike (2003) agrees that these skills will encourage children in their effective use of information. In other words, they should be able to know what they need, to what purpose, how relevant it is, and how to apply the information in problem solving. This article reports the state of information literacy delivery in some n school libraries in Enugu State, Nigeria, its effectiveness in building information literacy skills of primary school pupils and suggestions of ways that can lead to further improvements of the information literacy programme.

Statement of the Problem

Information literacy skills have been seen as a very vital element for lifelong learning in children. This is because the children need to start from scratch to become aware and have skills required in finding and using information from different places. In spite of this, children are not easily developing these skills (Dike, 2003, Moore, 1997). The reason could be that the school environment is not often conducive or the teacher- centred educational system where children are taught to read textbooks for examination. It could also be due to lack of time for teachers to dwell more on the school content. Consequently, pupils fail to exhibit these skills of information literacy before they leave schools.

Studies by Ogunsheye, Elaturoti and Kolade (2001) and Adeniyi (2005), etc, show that library period reinforces the goal of school library, to help pupils to become comfortable lifelong learners. Unfortunately, inadequate incorporation of this period by the school authorities has had a detrimental effect on the development of pupils' information literacy skills. For this problem to be solved, library professionals are conducting various programmes, which when incorporated with the period, could help to build pupils' information literacy skills.

This study was conducted to assess the information literacy programme in primary school libraries. The main objective of the study was to develop library period programme used in teaching information literacy skills in primary schools. A more specific objective of the study was to integrate library period curriculum with the school curriculum and evaluate its effect on information literacy skills of pupils.

Review of Literature

The American Library Association (2006) defined information literacy as "a set of abilities requiring individuals to recognise when information is needed and have the ability to locate, and use effectively the needed information." Individuals need to master these skills at early stage, especially at primary school level. Primary education is the foundation of all levels of education (Nigeria, 2004) and the objective of setting up primary education among other things is to inculcate permanent literacy and critical thing among pupils, and library has the potentials in inculcating this. Campbell (2006) pointed out that in some jurisdictions critical thinking, being part of the information literacy definition, is already being embedded to the elementary school curriculum. Children need to acquire the thinking skills for them to belong to the information literate society. There is necessity for critical thinking in information skills right from primary school level, which would be used in learning activities.

Information literacy is an umbrella term representing all forms of literacy skills, library use

skills as well, as critical thinking skills (Dike, 2006). Literacy skill is of great importance for information to be retrieved, for it is only with this skill that one has access to information in many forms. Literacy has to do with the ability to read and write. The skills that allow someone to perform well in the society would involve a "whole range of literacies, including visual literacy, media literacy, technological literacy, cultural literacy, computer literacy, among many others…" (Amucheazi and Dike, 2002). These skills are required for use of library are also information literacy skills. Through development of these skills, the library should no doubt be able to effect changes in attitude to learning; inculcate a spirit of enquiry; and promote the habit of seeking knowledge and information as basis for decision making. The use of library skills in learning to use information sources is now being stressed, as they involve knowing how to locate and access information from digital sources and present information in new ways such as a power point presentation (Dike 2006).

Dike (2008) noted that, among other library activities, project work is useful in developing critical thinking skills since information is relevant in problem solving and aids individuals to acquire the lifelong learning skills. The necessity for lifelong learning therefore makes information literacy vital for primary school pupils since they ought to be acquainted with these skills from scratch for assessing information for reliability and relevance and for recording and organising information (Dike, 2003). The teachers also need critical thinking skills in order to teach students the skills in finding, sifting and integrating information from a variety of sources. Because critical thinking is an important educational outcome for pupils, there is need for education administrators to find strategies to help foster critical thinking as a means to enhance information evaluation and information literacy among pupils. This will ultimately help students, both young and old, to think for themselves.

The school library is an ideal setting for development of information literate individuals. School libraries help in equipping a school child with the necessary information literacy skills needed. Udoh (2004) observes that the school library is the bedrock of education and should constitute a part of the design for any successful educational programme to ensure excellence. In other words, the school library provides significant opportunities for helping children learn how to access, evaluate and use information from variety of sources. Teachers need resources that will help them improve classroom instruction and students should also be able, with the help of the school library, to know what they need, how to find them and where to search for them. The school library provides an atmosphere for building in a school teacher or a child for that matter, the ability to identify whenever they need information and critically use it. The importance of school library cannot be overemphasised. Primary school libraries provide children with their first chance to use and enjoy a library. They need opportunities to use library materials in developing creativity and reasoning skills, and those opportunities can be provided by library periods.

Library periods are of special significance to the growth of information literacy. This is a class period carved out for school children to learn how they can use the library and its contents to gain various skills that help them in continuous learning. According to Dike (2008), it has to do with "a time set aside for pupils to learn how to use the library and its resources and by so doing acquire the skills for lifelong learning." The library period reinforces the goal of school libraries and education in other words, it helps pupils to develop information literacy skills, promotes reading, as well as provides resources in support of the school curriculum. Ogunsheye, Elaturoti, Kolade and Oniyide (2001) stated that "Education can only be deemed effective if it enables the individual to seek, discover and therefore to continue his own education." This makes it even more imperative for there to be a programme designed to guide the librarians in using this period effectively in helping pupils to learn how to locate, access and use information.

Modes of IL Delivery in Primary School Libraries

The library has different ways of delivering IL in children. These ways are: the library period, formal library instruction, story hour and project work.

Library Period

Integrating library period into the school curriculum

helps children develop their capabilities for exploring school subjects in a creative way using such information literacy skills as use of library skills, literacy skills and critical thinking skills.

Formal Library Instruction (Lesson)

Library instruction is one way of teaching students how to search for information. By so doing, there is hope that the school library will help improve the standard of student's research and acquaint them with the spirit of lifelong learning. Some of the objectives Ogunsheye, Elaturoti and Kolade (2001) listed out in their work are: to create and awareness for history and structure of the book; to identify features of a book; to introduce children to the use of an organised school library media centre; to develop the library use skills in the children, etc. This therefore calls for user education and library instruction to acquaint children with the knowledge of using the library.

Story Hour

Story hour can play an important role in the life-long education of children. This is due mainly to the fact that it helps to develop and nurture the reading habit and drive home points which have been abstract to a child (Fayose, 2003). The activities of story hour programmes are planned to build up pupils' interest in books, reading and libraries. It does not mean telling only stories; hence various activities are organised during the programme.

Project Work

Project work is one of the vehicles for developing information literacy education in primary schools the world over. This is because, as noted by Hart (2005), "Good project work adopts a constructivist approach of learning in which learners define a problem or question and then work through a process … of finding, interpreting synthesising and creating information to solve the problem. A project work is an extended and independent activity based on a given topic and resulting in a presentation of some type. The ultimate aim of any project work, whether done individuals, small group or a whole class is to provide an excellent way of developing the learning and information skills required for life-long learning in children.

Methodology

The study involved pupils from fifteen public primary schools in Nsukka Central L.G.A of Enugu State, Nigeria. At the time of the study, there were 49 state owned primary schools in Nsukka Central LGEA, and 15 of them had libraries. These are: Model Primary School I, Enugu Road Primary School I, Model Primary School II, Agu-Achara Primary School, Community Primary School I, Nru, Umuagu Primary School Nru, Central School, Nru, Hilltop Primary School, Obimo, Community Primary School, Onuiyi, Township Primary School I & II, Nsukka, Central School I, Nsukka, Community Primary School, Obimo, Community Primary School, Nguru And Umuakasi/Achara Primary School.

The purposive sampling method was used because the school libraries were developed on different level and by different organisations. Pupils in the schools used for this study were paired according to the organisation– governmental and non-governmental — developing their school libraries. The study was an experimental design hence, developed library period programme was used based on three methods of delivery: formal library instruction, story hour and project work.

The administration of the questionnaire was carried out in three phases: first, pupils were pre-tested. The aim was to ascertain their level of information literacy and make sure that all subjects were under the same condition with regard to their abilities to access, evaluate and use information effectively. Thereafter, all pupils (experimental and control pupils) were given orientation on the topic for the post- test: "marriage" before giving them the project to embark on. The aim of the post-test was to find out if any change or changes took place in the pupils' level of information literacy skills as a result of the treatment. The rating of the pupils would be based on their exhibition of information literacy skills in the post-test (project work). The skills and

Table 1: Presentation of Information Literacy Skills and the Rating

S/N	Literacy & Communication Skills	Point	Library Use Skills	Point	Critical Thinking Skills	Point
1	Listening skills	6	Visual skills	6	Planning skills	10
2	Reading skills	6	Note taking skills	6	Location & access skills	6
3	Visual skills	6	Location & access skills	6	Organisation skills	6
4	Writing skills	6	Organisation skills	6	Recording skills	6
5	Oral communication skills	6	Evaluation skills	6	Observation skills	6
					Questioning skills	6
	Total	**30**	**Total**	**30**	**Total**	**40**

the rating are presented in the table below:

It can be seen from the table that 6 points were allotted to all other information literacy skills that were developed except "Planning skills". The reason for this is that planning skill seems to give more difficulty to pupils and is more encompassing than other skills identified. Again, this skill appeared only once under critical thinking skill. The aim was then to make it have point that could be near to other skills. The table also shows that while literacy and communication skills and library use skills had 30 points each, critical thinking skills had 40 points. This was due to the reason given above that planning skills had 10 points instead of 6 others had. It also had six (6) skills while others had five (5). This increases the point for critical thinking skills.

To ascertain the worth of this experimental treatment, pupils were given the same project as those of the control groups. All the subjects were tested in three dimension- literacy skills, use of library skills, and critical thinking skills. Scores were allotted for each of the skills which pupils exhibited in their project work. Literacy and communication skills included: listening skill, reading skill, visual skill, writing skill, and oral communication skill; library use skills included: visual skill, note taking skill, location & access skill, organisation skill, and evaluation skill while critical thinking skills included: planning skill, location& access skill, organisation skill, recording skill, observation skill, and questioning skill. The whole skills were rated 6 points except planning skill (10 points) which did not appear in any other place. The sum score for each pupil was 100 points. The performance scores of each school in the two groups of subjects are shown below as compared with the skills they were developed along with.

Observations were presented in narratives. Document analysis was also presented in tables. Mean scores and standard deviation were used to ascertain the result of the two groups. Again, charts were used to compare the performance of the schools in order to make them more comprehensive. The schools' score were presented in comparison with the schools developed along with them. The hypothesis *that : There is no significant difference between the information literacy skills of pupils participating in library period programme and those not participating.* This hypothesis was tested using t-test statistics and comparison of mean scores of two groups.

Findings

Table 2 presents the results of the post-test performance obtained for the two groups and reveals that the schools for experimental treatment performed better than their counterpart control schools, hence Model Primary School 1, Nsukka (MPS1) had a higher score of 2281 points than its counterpart school, Enugu Road Primary School1, Nsukka (ERPS1) that had 1369 points. Also, Community Primary School, Obimo (CPSOB) had a higher score of 1424 points over its counterpart school, Community Primary School, Nguru (CPSNG) that had 1078 points. This could account for the overall score of 9485 points for school A over 6962 points of school

Table 2: Presentation of Post Test Performance Scores of Two Groups of Subjects on Information Literacy Skills

No. of pupils	Experimental Group A	X_A	No. of Pupils	Control Group B	X_B
40	MPS1 (E_1 focus)	2,281	35	ERPS (C_1 focus)	1,369
40	APS (E_2 ETF)	2,239	40	MPS2 (C_2 ETF)	1,960
23	CPSNR2 (E_3 UBE)	1,248	28	HPSOB (C_3UBE)	880
40	CPSNS (E_4 Urban)	2,293	40	TPS2 (C_4Urban)	1,675
30	CPSOB (E_5 Rural)	1,424	30	CPSNG (C_5 Rural)	1,078
173	**TOTAL**	**9,485**	**173**	**TOTAL**	**6,962**

B. The comparison is further presented on a chart for a better understanding.

Key:

Experimental Group A

MPS1– Model Primary School 1,Nsukka; Aguachara APS – Primary School, Nsukka; CPSNR2 – Community Primary Schools II, Nru; CPSNS– Central Primary School 1, Nsukka; and CPSOB – Community Primary School, Obimo

Control Group B

ERPS1 – Enugu Road Primary School1, Nsukka; MPS2 – Model Primary School II, Nsukka; HPSOB – Hilltop Primary School, Obimo; TPS2– Township Primary School II, Nsukka; and CPSNG–

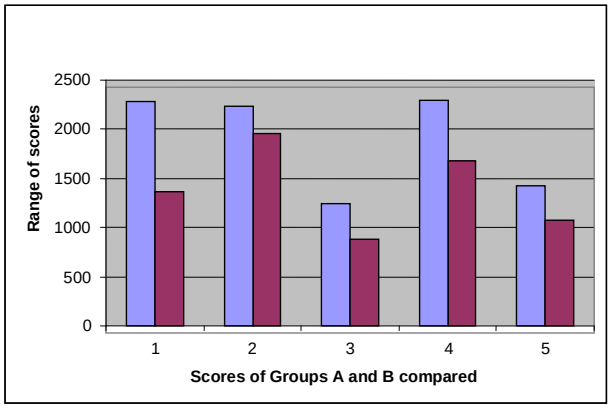

Chart1: Comparison of Performance Scores of Groups A and B

Light: Group A

Dark: Group B

Chart 1 reveals that each of the schools in experimental group A had a higher result than their counterpart schools in control group B. Model Primary School 1, Nsukka, Aguachara Primary School, Nsukka, and Central Primary School 1, Nsukka scored above 2000 points over their counterpart schools that scored below 2000 points. Despite the fact that the other two schools were fewer in number, they scored above 1200 over their counterpart school, that scored below 1200. This could be as a result of the treatment given to the former.

Research Hypothesis:

Ho: there is no significant difference between the information literacy skills of those participating in library period programme and those not participating. To test this hypothesis, the individual school's scores were merged in order to find the overall scores of the

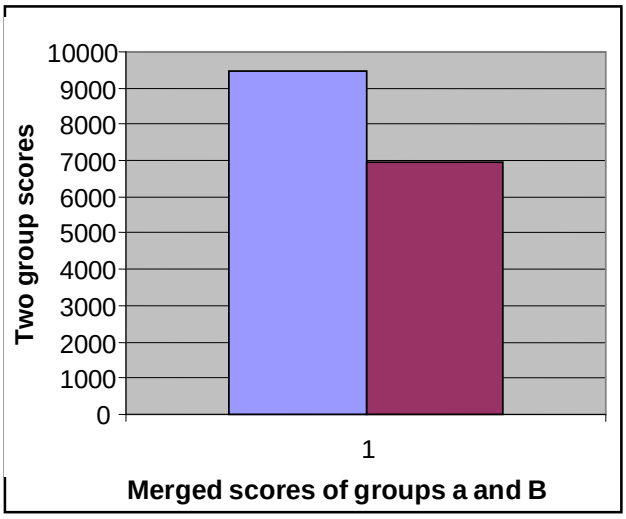

Chart 2: Overall Comparison of Treatment Group A and Control Group B

Light: Experimental Group A
Dark: Control Group B

two groups of schools.The amalgamation is presented and compared in chart 2, which reveals that following the treatments administered on primary schools pupils; the experimental group A had an overall higher score of 9485 than Control school B which has a score of 6962 making a difference of 2523. This remarkable difference was due to individual school's higher scores over their counterpart school. Statistics reveals that following the treatments administered on primary schools pupils, the experimental group had a higher result with a mean score of 54.83 and a standard deviation of 10.54 while the control group (no treatment at all) had a mean score of 40.24 with a standard deviation of 10.37.

Information literacy skills scores had its calculated values as 13.02 which was greater than the t - value of 1.96 (two tailed test) at p d" 0.05 levels of significance and 344 degrees of freedom. This indicated that there was a significant diference between the information literacy skills of those participating in library period programme and those not participating. With this result, the null hypothesis (H_O) of no significant difference in the information literacy skills of the two groups of subjects is rejected.

Effect of Library Period Programme on the Information Literacy of the Pupils

From the findings of the study, the library period programme was very effective in developing the information literacy of the pupils. Hence, there was observed development in pupils' information literacy abilities. From the findings of the study, the treatment group/pupils were continuously developing their information literacy skills through the library period programme by building their listening skills, writing skills, reading skills, communication skills, visual skills, note taking skills, location and access skills, planning skills, organisation skills, questioning skills and evaluation skills. This continuous development observed was reasonably different. The possible explanation for experimental group A's higher scores than control group B could be based on the library period programme given to them. This view agreed with a similar report by Abadina Media Resource Centre (1987), Town (2002), etc, that library period programme is a forum for developing the creative abilities lacking in many children. Information literacy is knowledge rather than simple skills which is achieved through education. This shows that those administered library period programme could possibly have higher level of information literacy than those not administered with library period programme. The implication is that the obtained result of difference in performance of subjects might be purely due to the effects of the treatments (administration of library period programme) since the pupils were subjected to the same experimental conditions.

Implications of the Study

The findings of the study have some implications for the educational policy makers, school administrators, school librarians, teachers and children, particularly in Enugu State, Nigeria in building information literacy skills of children in the following ways;

If lifelong learning is to be built in pupils, there is need for educational policy makers to include library periods in their policy and lay more emphasis on information literacy education. It is only when this happens that the aim of education in general will be attained.

Again, school administrators should allot time for the effective use of the curriculum/ programmes

developed and also have a permanent school librarian for this purpose so as to make maximum use of the period to teach this curriculum. This is because the school curriculum may not give pupils opportunities to use variety of library resources and beyond to expand their horizon of learning. If a school librarian is not allowed a period in each school to assist pupils in using this period creatively, there will be difficulty in creating a future generation who have learnt how to learn.

Furthermore, if the school librarians are to use this period effectively, there will be need to have a common standard programme that could serve as a guide and help teach children contents in the school curriculum. This will in turn fill the gap between school curriculum and information literacy education.

If teachers are to create more active and creative pupils, they will need to collaborate with the school librarian in this information literacy activity thereby giving the librarians chance to help build up children's information literacy skills with library period programme. This cannot be realised without allowing the school librarians their time when it is right and if children are taught these skills, learning will become more interesting to them since it is continuous and lifelong.

Conclusions and Recommendations

Library period curriculum is both effective and affective in pupils' learning. Pupils have exhibited great abilities to manage information from wide variety of resources. Through the use of the three vehicles: story hour, library instruction and project work, pupils develop their information literacy skills. Story hour certainly is a very powerful means of developing pupils' emotion, teaching them what they should know in a pleasant manner and re-emphasising what they already know. Projects also expose them to their wider environment and in an attempt, make them more conversant with people and things around them. The following recommendations are made.

- Educational policy makers stipulate the use of library period to develop children's information literacy skills in their policy.
- School administrators allot a library period programme in primary schools and also employ a full-time school librarian to make maximum use of this period with children in order to build their information literacy skills.
- Primary school teacher collaborates with school librarian in integrating the library period with the school curriculum in order to build pupils' information literacy skills.

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Health Care Information Needs and Behaviour of Home-Based Elderly People in Kenya: A Case Study of Nakuru District, Kenya

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Abstract

This article reports on findings of a study which investigated the information needs of the home-based elderly in Nakuru District, Kenya. A qualitative approach was followed in data collection and analysis. Findings showed that personal factors, including literacy and language capacity, memory constraints, physical impairment, influence their Information Behaviour (IB) in varied ways. Similarly, environmental factors, including health-care services, financial resources, cultural traditions, and education, determine how they access, use or avoid information. Insights gained proved the value of understanding the role of IB in information services.

Keywords:

Health-Care Services, Home-Based Elderly People, Information Behaviour, Information Needs, Kenya, Aged People.

Introduction

Aging causes physical, psychological and social changes and a great deal of uncertainty that elderly people need to cope with. Studies maintain that the elderly need information in order to cope with this uncertainty (Barrett, 2000; Popoola, 2000; Frase, 2004; Schwartz, Woloshin & Birkmeyer, 2005; Charles & Sevak, 2005). In African countries, such as Kenya, health-care of the elderly rests with individual people and/or their families (Apt, 1997; Kalasa, 2001). Most elderly people live in their homes, or with family members, because of cultural expectations that younger members of the family take care of the older members (Apt, 1997; Nyambedha, Wandibba & Aagard-Hansen, 2003). However, considering the concerns raised in research reports about caring for the elderly in African countries (Apt, 1991; Amuyunzu, Muniu & Katsivo, 1997; Oranga, 1997; Akanji, Ogunniyi & Baiyewu, 2002; Juma, Okeyo & Kidenda, 2004; Ahadzie & Doh, 2008; Okoth, 2010), it seems evident that many of the information needs of the elderly are either not recognised, or are not met satisfactorily.

In order to put into perspective the relationship between information behaviour and health-care of the elderly in a development context, it is necessary to approach the problem from two different angles. This includes a description of the existing state of health-care of the home-based elderly in the identified development context, as well as understanding the concepts of information needs and their impact on information behaviour (IB) of the home-based elderly. Societies and cultures define the concept 'elderly people' differently. For the purposes of this study, the United Nations definition of old age as anyone of '60 years and above' is used.

Demographic projections show that Kenya is among the sub-Saharan countries with the fastest

growing populations of older people (Velkoff & Kowal, 2007). The absence of reliable data on the elderly in Kenya makes it difficult to provide figures about the number of elderly people who live in homes and those that live on their own, or with family members in rural and urban centres. However, a literature study revealed that most elerly people in developing countries like Kenya live in their homes or with family members, and are vulnerable to poverty (Mba, 2004; Juma et al., 2004; Kalasa, 2005; Mathangani, 2005).

According to Khayesi (2011), there are only a few homes for elderly people in Kenya and the few that do exist can be found predominantly in urban centres. The majority of Kenyans upon retirement return to a home they have kept in the rural area, even though they have worked in an urban setting all their lives. However, personal observation indicates that this trend is changing with some retirees preferring to live in the urban centres in order to benefit from social amenities such as health-care, transport, piped water, opportunities to conduct private businesses.

Apt (1991, 1997) showed that there is a need for governments in African countries to prepare and implement policies for the care of elderly people. For example, the Kenyan government indicates that by 2050, 11.8 percent of the national population will be elderly people (Republic of Kenya, 2001). It seems evident that as the number of elderly people increases, their need for health-care will also increase. Furthermore, it is important to take into account that Kenya has not fully implemented a policy for the care of elderly people (Waithaka, Anyona & Koori, 2003; Juma et al., 2004; Mathangani, 2005; Muigana, 2006; Kenya National Commission on Human Rights (KNCHR), 2009; Okoth, 2010).

Under current conditions, the elderly receive care from both formal and informal health-care providers. Formal health-care providers include doctors, nurses, clinicians, pharmacists and other professionals trained to provide health-care services (Republic of Kenya, 2007; 2008). Informal health-care providers include immediate family members (spouses, siblings, children, friends and other relatives) of the elderly people (EUROFAMCARE, 2006; Bookman & Harrington, 2007; Khayesi, 2011).

From the literature reviewed so far, it seems that most of the studies on the elderly, in Africa and Kenya specifically, approach issues regarding the elderly primarily from a macro level. They focus mainly on demographics, policies and provision of general health care services that include the elderly amongst others. However, none of these studies approach the problem from the perspective of the elderly *per sé*. Very little is known about the elderly in everyday life situations and how they deal with uncertainty and the changes that come with growing old. Very little is also known about their needs and provision of information, except their exposure to information about medical treatment when visiting health-care services. It becomes apparent that there is an urgent need to look at the health-care of the home-based elderly people in terms of their information needs and behaviour, which may be influenced by personal factors as well as environmental factors. This article thus seeks to investigate the same. With regard to key issues such as information needs, personal and environmental factors, the most prominent publications like Hjørland (1997); Wilson (1999, 2005); Case (2007); Courtright (2007); Naumer and Fisher (2010); and Cole (2011) have been consulted among others.

Information Needs and Behaviour

Cole (2011) argues that the concept 'information need' is one of the most essential concepts in information science, but is a misunderstood concept. He adds:

Unlike the need for food, water, or shelter, or any of the other primary human needs, what is required to satisfy an information need is often not known to the individual concerned.

The reason for this is perhaps best explained by Hjørland (1997) who argues that what develops in the head [of a person] is not necessarily the need but knowledge about the problem-area which causes a need. The context or information situation of the user from which the information need arises is important (Cole, 2011). Both these authors suggest that factors prevalent in the person, as well as in the context (information situation) may be instrumental in triggering information needs.

In Wilson's (1999; 2005) models of information behaviour, he addresses the concept of information

need by categorising human needs into three groups, namely: physiological (e.g. the need for food), psychological (for example the need for attainment), and cognitive (the need to plan or learn a skill). According to Wilson, the three categories of human needs can influence each other, leading to experiencing a need for information. Wilson shows that information needs are linked to human needs. However, Wilson (2005) suggested that the term "information need" should be ignored and replaced with "information seeking behaviour." Wilson's definition focuses on observable constructs while needs are internal mental states that cannot be seen. However, inner experiences give rise to observable responses of human beings, as manifested in people's activities such as information seeking and sharing in order to respond to challenges and information needs. It seems thus obvious that information needs prevalent to elderly people could arise from the changes they experience as they age.

Although we might have some clarity on what causes information needs among the elderly, it is still not clear what the nature of the information needs might be and who within health-care of the elderly in a home-based context could help to identify and best address them. Regarding the nature of information needs, Case (2007) indicates that the concept information needs has to do with seeking answers, reducing uncertainty and making sense.

Although not much is known about how home-based elderly people experience or express their information needs, it is possible that they may experience their need for information in what Hjørland (1997) refers to as 'knowledge about the problem-area in their heads'. These problem areas may be linked to changes experienced in old age.

Although feelings of anxiety are often expressed by the home-based elderly in African communities (Mathangani, 2005; KNCHR, 2009), it seems unclear whether it serves as a strong enough motivation to consciously seek for information.

Methodology

To investigate the information behaviour of the home-based elderly in Kenya, a qualitative research approach was followed. This enabled the researcher to gather data in a 'natural' setting, and to observe experiences, insights and actions of elderly people that would not have been possible with a quantitative approach such as a survey.

The snowball sampling technique was used as a data collecting technique to identify people who were prepared to share their own views; that were of different socio-economic levels, of the same or opposite gender; held different opinions and also come from different ethnic backgrounds to participate in the study (Mugenda, 2008). The snowball technique helped to obtain a balanced and objective view of the existing situation in the identified geographical area. Eighteen elderly people participated in the investigation. Respondents varied in gender, educational levels and economic status. Respondents from both the urban and the rural areas of Nakuru District Municipality participated in the study.

Open-ended face-to-face interviews were conducted with individual respondents in order to promote dialogue and narration. This approach helped to give respondents an opportunity to provide details and reflect on personal perceptions about individual and environmental characteristics and their influence on information needs of the groups in health-care of the elderly people. It also ensured high response rates as opposed to other data-collection techniques such as telephone interviews. In addition, interviews provided an opportunity to observe the non-verbal behaviour of respondents and correspondingly adjust the choice of language to be able to probe for details (Neuman, 2003; Cooper & Emory, 1995). English and/or Kiswahili were used to interview the elderly people as was found appropriate. An interpreter with research and work experience in library and information science translated some of the topics of discussion into Kipsigis, the local language widely spoken in this district.

In line with qualitative research procedures, the collected data was analysed and reported simultaneously (Mugenda, 2008; Neuman, 2003). Open coding was used to categorise and classify data and similarly recurring items from the scripts were highlighted. Field notes were also analysed and incorporated into the report summaries. Content analysis was used to categorise patterns emerging from the data and to help the researcher to identify themes based on the objectives of the study.

Discussion and Findings

During the investigation, it became apparent that although the elderly of Nakuru District are intensely aware of physical, psychological and social problems they experience in old age, they did not appear to think of using information to alleviate their problems. These findings confirm Wilson's (1999) and Cole's (2011) viewpoints that information needs are often not recognised by the individual(s) concerned. The findings further showed that the elderly are concerned about medication, nutrition, financial aid, health status and spiritual and emotional support to prepare for the end of life. This awareness seems proof of their 'knowledge about the problem-areas in their heads' (Hjørland, 1997). In spite of this awareness, the underlying needs were not clearly articulated and therefore could be referred to as visceral needs (Taylor, 1968).

When viewpoints of respondents within the home-based context were compared, a pattern emerged of how personal traits and contextual factors interact to give rise to the information needs as will be discussed hereafter. Although findings regarding the impact of personal and contextual factors are discussed separately below, it has been found that their presence is not experienced in isolation. They seem to trigger different types of information behaviour among the elderly, which make it difficult to explain their impact in isolation. It also appeared that some of the needs and also the resultant information behaviour evolved due to the home-based situation.

In discussing the findings on how both personal factors and environmental factors may influence elderly people in terms of their information needs and behaviour, there is need to clarify what is meant by information needs, as already stated in the introduction. This will provide a foundational base for the arguments and discussions that follow.

Personal Factors

Physical, psychological and social changes and uncertainty that elderly people experience are viewed as personal factors that could influence their information behaviour. This viewpoint is supported by evidence from the literature such as Wilson's (1999, 2005) models of information behaviour, where he refers to the physiological, psychological and cognitive inner experiences as influencing each other and leading to experiencing a need for information. Similarly, Hepworth (2007) too *recognises different personal inner states, namely: cognitive, affective, and environmental (contextual) characteristics that can give rise to information behaviour. Under personal factors of the elderly, we further look at literacy and language levels, memory constraints and physical impairment and personal preferences as some of the personal factors that could influence their information needs and behaviour.*

Literacy and Language Capacity

The different levels of competency among the respondents regarding language and literacy are important personal factors that determine to what extent they access, interpret and use information that can solve problems such as making sense of the changes that come with the ageing process. In the comparison below, it becomes evident to what extent this group of factors influenced the information behaviour of the home-based elderly.

About half (10 out of 18) of the elderly interviewed, indicated that they were literate in English, Kiswahili or their own indigenous languages. They confirmed that they were able to follow some of the health care information on their own. They also indicated that the formal health-care providers did share information with them in the language of their choice.

However, the other half of the elderly respondents (8 out of 18) indicated that they were illiterate and thus could not access written information on health-care matters. It also meant that this group was unable to follow written health-care instructions, irrespective of language. Illiteracy therefore acts as a barrier to those who are unable to access written information on their own. This necessitates verbal communication of health-care information. Normally, these elderly request literate family members to accompany them to the hospital to take instructions on their behalf. Thus, it seems evident that the illiterate elderly require person-to-person sharing of information to benefit from existing health-care services.

Although the literate care providers could follow written instructions in at least three different

languages, the findings showed that they were not familiar with medical terminology. The literate care providers therefore needed information in lay terms to ensure they could assist the elderly in their care.

Memory Constraints

Memory constraints are one of the physiological changes experienced by the elderly that can cause a lot of uncertainty in terms of taking medication, or keeping appointments to visit health care services for checkups.

Some of the elderly who participated in the survey reported that they were afraid of forgetting instructions conveyed orally, as they were unable to read written health-care information. Forgetfulness gave rise to emotions of uncertainty and anxiety among the elderly, and made them more dependent on informal and formal health-care providers.

The findings showed that the problem of failing memories was to some extent taken care of by health-care providers by writing instructions in a note book for patients to carry home (Republic of Kenya, 2007; 2008). The rationale behind this practice was to ensure that the elderly have at hand details of their medication and dates for checkups when needed for verification by either health-care professionals during check-ups, or their personal care providers. The note book proved to be a multi-purpose information source that not only helped to address the memory and uncertainty problems on the side of the elderly, but also to streamline procedures to communicate relevant information to the respective professionals. Seemingly, it also alleviates the language problem in cases where the elderly are not conversant in any of the official languages, or familiar with medical terminology. Evidently, the note book practice is an example where personal and contextual circumstances shaped the information behaviour of the formal health-care providers in response to visceral information needs of the elderly (Taylor, 1968).

Physical Impairment

Physical impairments such as poor eyesight, hearing impairment, and increasing immobility are personal factors that impact on the elderly person's need to find answers, to reduce uncertainty, or to make sense of the changes brought about by the ageing process. Considering the argument that factors in the personal and contextual dimensions of information behaviour give rise to information needs, these conditions proved to be relevant in terms of the information behaviour of the elderly.

Findings showed that one-third of the respondents (6 out of 18) indicated that they suffered from poor eyesight, which hinders reading to access health-care information. Similarly, hearing impairment and loss of memory deprived them of opportunities to interact effortlessly with other people to access or recall relevant information; a situation which increases isolation and uncertainty.

In addition, half of the elderly (9 out of 18) reported that due to heavy workloads, family responsibilities and other commitments, they did not always have time to go out to find information about their health conditions. Immobility as a result of poor health also meant they were unable to seek information outside their homes, as indicated by the quote below:

"I do not go beyond this small compound. Poor health has denied me chances to visit friends, relatives and other places where I can get information on my own."

From the reference to 'friends and relatives' in the quote above, it seems evident that the elderly interviewed, preferred to turn to people instead of textual sources to access relevant information. Apparently, help from family members and friends create opportunities for some elderly people to overcome challenges of access to information. The elderly reported that family members hired taxis when they had to go to hospitals for treatment or checkups. They also obtained health-care information from visiting relatives and friends, as well as from health programmes presented on local radio stations. It seems that interaction with friends and listening reveal something of the preferred means of accessing information among the elderly.

Personal Preferences

Another personal factor that impacts on the acceptance and use of information among the home-based elderly proved to be personal preferences. Akanji et al. (2002) indicated that elderly people in African countries have a preference for complementary and alternative medicine (CAM),

since herbal medicines are traditionally used here, they were provided in a more acceptable format and on a more accessible level for them. These findings are consistent with those of Chui, Donohgue and Chenoweth (2005) on Chinese cancer patients in Australia who chose to use traditional Chinese herbal medication rather than conventional Western medication.

During the investigation, it was observed that the elderly often took their note books, issued by the health-care service to their local CAM dealers. Apparently, the latter understood enough of the medical terminology to enable them to suggest alternative products which they stock that they then offered to the elderly. As a result, the messages in the note book intended for pharmacists are now rerouted in a concealed manner to another actor who provides products that might not have been proven safe or effective for treatment of a particular health condition. From an information behaviour point of view, it seems that the elderly are indifferent to the value of scientifically tested information and are more concerned about the costs of medication, since many of them find it hard to make ends meet in terms of financial expenditure. The elderly also confirmed that they found the people working in CAM stores friendlier and more accessible than the doctors in government health care services. Apparently, staff working in CAM services listened to them and did not hurry them unlike the professional health workers. This seems to be evidence of how personal factors and contextual factors are instrumental in shaping the information behaviour of the elderly.

Environmental Factors

Various studies (Taylor, 1968; Courtright, 2007; Naumer & Fisher, 2010) show that an information need is best understood when it is viewed from the environment or context in which it originated. The findings showed that environmental characteristics such as financial support, interpersonal relationships experienced in health-care facilities, cultural traditions, the Internet and political decisions also influenced the need for information for health-care of elderly people. The influence of environmental factors is discussed in the sections below.

Health-Care Services

A combination of personal and contextual factors seems to contribute to information behaviour that results in strained interpersonal relationships. These factors also seem to be instrumental in the lack of consistency in exchange of information for geriatric care. Their perceptions of the interpersonal relationships seem to be rather negative as captured in the following quote:

"Most nurses in government hospitals are very useful, especially if you deal with the same one regularly. But some of them seem to be impatient with elderly people, particularly if they [elderly] are not accompanied by someone that understands the system in the hospital."

The elderly respondents' view of the government's approach towards their health-care situation was generally negative, based on the current services provided. The contextual factors impacting on information behaviour proved to be policies, political support and infrastructure, as indicated by the following quotes:

"Politicians in this country can help to raise funds for needy cases but not support implementation of a policy for care of elderly citizens."

"Some of the parliamentarians are our age-mates, and others are much older than some of us. But they forget all about the welfare of elderly people as soon as they get to Parliament."

Another factor determining their perception seemed to be the waiting in long queues at health-care facilities. Respondents felt that time spent in queues at health-care facilities is not well compensated for when they finally meet with formal health-care providers on duty. The general perception is perhaps best captured in the following viewpoint of one respondent:

"It frustrates me sometimes when I go to the government hospital. I have to wait in a queue for a long time. And when I get to a nurse, she wants to spend very little time with me. Then I have to go to another queue for an injection or at the hospital pharmacy for drugs if they are available."

The elderly sometimes lose their note books in which the health-care providers wrote their diagnosis and prescriptions, and some occasionally came to the professional health-care facilities in company of different informal care providers – all conditions that

are not conducive for the smooth flow of information.

Financial Resources

Apart from education and reading skills to access and use textual information, financial resources are important when it comes to access of information beyond one's personal collection or personal interaction with people in one's immediate environment. The findings showed that the majority of the respondents (17 out of 18) had little or no discretionary income for purchasing resources such as books, magazines, and newspapers that provide health-care information. The findings also suggest that a combination of a high level of exposure and education during their active years and a stable income in retirement helped some elderly people to purchase information resources to help them in health-care.

Cultural Traditions

Cultural traditions constitute another contextual factor that manifests in people's information behaviour and proved to be significantly influential within the health-care context of the home-based elderly. The findings revealed some reluctance among elderly people to share information about their personal health status with younger people, people of the opposite gender, and sometimes their informal care providers. The majority of elderly respondents (12 out of 18) indicated that they were aware of cultural practices that prohibited sharing of certain types of information with younger people, or people of the opposite gender. Respondents, especially those from the rural areas, acknowledged that they found it difficult to discuss some of their health issues with younger people and people of the opposite gender. They indicated that they preferred to share their intimate health-care details with people who were closer to their age. This implies that elderly people might be more willing to approach older formal health-care providers. Such preferences of whom to share information prevent them from accessing useful information that could address their health-care problems.

Responses from formal health-care providers also confirmed that some elderly were indeed reluctant to reveal details of their health conditions to formal health-care providers that were younger or of the opposite gender. It seems that the elderly people do not intentionally conceal intimate information from formal health-care providers but act in accordance with cultural practices that prevent them from sharing intimate physiological problems with outsiders. In this regard, formal health-care providers indicated that the elderly tend to use metaphorical or euphemistic expressions to communicate what they considered intimate information, because of their cultural traditions. This indirect form of communication resulted in a negative perception of elderly people, and affected the exchange of information between these two groups that are dependent on each other to make the right decision in terms of treatment.

Based on the findings, it seems evident that unwillingness to collaborate with other groups of people within the home-based context prevents free flow of information that can alleviate the need for geriatric information.

It seems that cultural factors such as norms and values were instrumental in obstructing access to health-care information held by professional members in the health-care context of the home-based elderly. These findings seem to be consistent with Courtright's (2007) findings on how cultural traditions can shape information behaviour.

Education

The findings showed that prior to retirement, some of the elderly people were professionals in various fields while others had no professional training. However, only three of the elderly people (one former health-care provider, a former science teacher in secondary school and an agricultural officer) indicated that they were able to understand information presented in medical terms. A lack of background knowledge in geriatrics and a need for information presented in lay terms determined to a certain extent the scope and nature of information needs of the elderly in health-care. Some of them indicated that they could access health-care information in lay terms on their own but needed help to access information written in medical jargon. It seems evident that professional training and knowledge gained through work experience helped some of the elderly later in life to search for information for their health-care with minimal help.

Conclusion

Consulting information resources and the manner of accessing information is a prominent component of information behaviour which Wilson (1999) identified as information activities resulting from the impact of personal and environmental factors. From the findings, it became evident that personal factors such as language and literacy, and contextual factors such as education and financial resources had a profound effect on how the elderly in the home-based health-care context perceived information as a resource to help them to alleviate uncertainty, or to make sense of their everyday life experiences. This applies also to the manner in which information resources are consulted. The elderly whose literacy levels vary tend to prefer to approach knowledgeable people for advice, rather than consulting textual sources. Interestingly, some sort of denial seemed evident from their answers to the interviewers claiming that financial and time constraints were to be blamed for not seeking information from textual sources such as books.

It was also clear that all the elderly were unable to use the Internet which was available either through the cyber cafés or on their cell phones. Lack of digital skills among the elderly resulted in non-use, or indifference to the Internet as a potential resource to access information for health-care purposes. The findings showed that most of the current generation of home-based elderly (who have access to the Internet) may need intermediaries such as informal care providers to help them to access health-care information available on the Internet.

The investigation also proved how important it is to clearly understand what exactly causes information needs among a group of people in an everyday life situation before an information provision strategy can be launched.

Although the study highlighted the real life information behaviour in health-care of the home-based elderly in Nakuru District, more research will be required in order to design a strategy on how to engage the many stakeholders involved in health-care services and policies to help the home-based elderly and care providers to deal with uncertainty and anxiety when growing old.

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Corporate Knowledge Leakage: A Case study of three Southern Africa Development Community (SADC) Public Broadcasting Organisations

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Abstract

Knowledge attrition is a worldwide challenge that can impact negatively on a particular organisation. This study is based on a PhD degree that was completed in 2012. The study investigated how knowledge loss affected three member states of Southern African Development Community (SADC) public broadcasting corporations' performance. These are Botswana, South Africa and Zimbabwe. A survey questionnaire was administered to 162 professionals and managers in the three public broadcasting organisations. This included 37 managers were drawn from the departments of: Human Resource, Engineering, Library and Archives, Radio and Television, Finance and Accounts, Administration, Corporate Services, Information and Communication Technology, Sales and Marketing, Programming, Learning and Development, Transport, Procurement, Content Enterprises, Organisational Development, Audiences Services, Licences, Broadcast Information Technology, International Affairs and Public Commercial Services. The results showed that the three broadcasting corporations have lost valuable knowledge to other competitors but still there are no measures to harness this knowledge haemorrhage. The study therefore recommends the establishment of a knowledge officer's post to oversee the management of the broadcasting corporations' knowledge.

Key words:
Knowledge Management, Knowledge Loss, Corporate Memory, Knowledge Leak, SADC

Introduction

Knowledge loss due to various forms of workforce attrition in organisations is inevitable. Critical knowledge in departments of the broadcasting organisations in SADC region largely rests with people. Poole and Sheehan (2009) believe that when such people leave they take with them the critical knowledge. Sallies and Jones (2002) are of the view that knowledge loss is immensely damaging and serious when key individuals leave the organisation. Poole and Sheehan (2009) assert that if the expertise of senior staff is not transferred to the next employee, the potential to innovate will be eroded and there is an increased risk that avoidable mistakes will become a regular occurrence. Knowledge loss is not without its negative effects on the organisations losing it. Moreover, the loss of expertise with knowledge built up over employee's careers as well as client intelligence has implications for organisations' competitive intelligence.

In a recent survey conducted by Manpower (2010), 80% of the 2000 respondents who were randomly sampled stated that almost 5% of their staff were about to leave the organisations. In yet another study, Right Management (2009) (cited by Tennessee Valley Authority, 2007) noted that 60% of employees intended to leave and pursue new jobs while 21% of the employees were busy networking with potential employers. These findings suggest that the surveyed companies were bound to lose vast amount of organisational knowledge that was accumulated over years of company experience.

Lahaie (2005) investigated the impact of corporate memory loss at Huronia District hospital, Canada. Findings indicate that the departure of senior

managers at this hospital caused serious ramifications due to knowledge loss. Other risks of losing organisational knowledge, as observed by Manpower (2010), were financial impact of replacing lost knowledge through training of new employees. Manpower's (2010) interpretation of the loss of knowledge is that the value of the organisational knowledge lost when employees leave is difficult to quantify.

Tennessee Valley Authority (2007) in America is reported as facing challenges of an ageing workforce nearing retirement with 30-40% staff eligible for retirement in 5 years' time. This will result in potential loss of critical, specialised knowledge. In the opinion of du Plessis (2004), the risk of knowledge deterioration that may arise when people leave an organisation can be reduced by knowledge retention through capturing of the organisation's individual tacit knowledge or team capabilities and subsequently transforming it into organisational knowledge and documentation processes.

Knowledge Attrition in SADC Broadcasting Corporations

Knowledge loss among SADC broadcasting corporations in general is worrisome. For example, the South Africa Broadcasting Corporation (SABC) has been losing its key personnel and witnessed high turnover of its six top leadership responsible for transforming the corporation (The Star, 1999). Moreover, SABC lost a number of experienced managers who included 16 journalists in a span of six months. In 2007, 76 staff members from various departments quit SABC. In addition, 12 top-drawer journalists and presenters left (Motsepe, 2004).

In Zimbabwe, the Zimbabwe Broadcasting Corporation (ZBC) has not been spared either. According to Southern Africa Migration Project (SAMP) (2004), the brain drain of skilled professionals from Zimbabwe has become particularly voluminous and damaging over the last decade. In June 2002, the state broadcaster lost experienced staff in a restructuring exercise when 60% of the workforce was retrenched (ZBC Brochure, 2010). Zimbabwe has lost thousands of its talented professionals in their twenties to Britain, the US, South Africa and Australia; among them are doctors, nurses, engineers, lawyers and journalists (SAMP, 2009). The same pattern of knowledge has been reported in Botswana.

Statement of the Problem

Knowledge attrition is a worldwide challenge that can impact negatively on a particular organisation. Broadcasting organisations need to take precautionary measures to ensure that the departure of employees does not affect service delivery, quality of products and production, among other things. Loss of knowledge is damaging and if broadcasting organisations do not put measures to capture important/critical knowledge, then organisational knowledge in employees' heads can walk out with the employees at the time of their departure. Failure to harness corporate and individual knowledge may result in loss of expertise and knowledge, loss of productivity, reductions in the quality of future knowledge (Sallies and Jones, 2002).

Objectives of the Study

The study sought to:

- establish which form of knowledge (tacit or explicit) is more important in broadcasting,
- identify categories of knowledge that have been lost in various sections of broadcasting,
- establish the effects/impact of such loss in the said sections of the broadcasting organisations.

Methodology

The study used the survey method and employed the triangulation design for data gathering and analysis. Data were collected by administering a questionnaire to staff and interviewing managers from three public broadcasting organisations in Botswana, South Africa and Zimbabwe. A survey questionnaire was administered purposively to 162 professionals (that included 37 managers) in the three public broadcasting organisations. The professional staff in the three corporations consisted of journalists, reporters, engineers, radio and television presenters and announcers, librarians, information technology officers, producers, sales and marketing officers, archivists, training officers, human resource officers, events coordinators, finance and accounting officers. These 37 managers were drawn from the departments of: Human Resource, Engineering, Library and

Archives section, Radio and Television, Finance and Accounts, Administration, Corporate Services, Information and Communication Technology, Sales and Marketing, Programming, Learning and Development, Transport, Procurement, Content Enterprises, Organisational Development, Audiences Services, Licences, Broadcast Information Technology, International Affairs and Public Commercial Services.

Discussion of Findings

Respondents were asked questions about their personal information such as their age, level of education, and experience in the broadcasting industry. The general response rate was 100% for the interviews and 68% for the self-administered questionnaire.

Characteristics of Respondents

Age group data obtained from the three broadcasting corporations indicate that the highest numbers of respondents were between the ages of 25-35 years (71; 43%) and followed by 36-46 age group (57; 34.5%). Respondents between the ages of 47-57 and those less than 25 years ranked third and fourth with 29 (17.5%) 6 (3.6%) respectively. The lowest number consisted of 2(1.2%) respondents between the age of 58-65 years. Interestingly, there were no respondents aged above 65 presumably because they would have retired.

Analysis by highest levels of education attained revealed that 87 (54.04%) have Bachelor's degree, 48 (30%) are Diploma holders, 10 (6.21%) have Master's degree. Matric/Advanced Level/High School accounted for 5.59% while, 7 (4.16%) had post matric and post Advanced Level Certificates. There were no responses to the PhD category.

In terms of experience, the majority (44%) had served in their respective organisations for a period between 0-5 years and the least (3.11%) had worked for the organisations for a period in between 31-40 years.

During the interview, managers were required to state the length of time they had worked for the organisation. This would help in determining the knowledge accumulated about the organisation and its culture (Giovanni, 2009). The longevity of service of the managers is represented as follows: 10 (27%) had worked for between 0 to 5 years; 6 (16%) for 6-10 years; 9 (24.3%) for 11-20; 12 (29.72%); for 21-30 years; and 1 (2.70%) for 32-40 years. No manager indicated the "other category".

Giovanni (2009) is of the view that interviews should generally involve people in the top hierarchy since these people possess appropriate knowledge and information. The level of education combined with experience equips managers with vast and thorough organisational knowledge that is used to furnish researchers with detailed and precise responses thereby increasing the reliability of the results.

From the interviews, it was revealed that five managers were diploma holders, 25 had first degrees, four had master's degrees, one indicated a post high school certificate another mentioned a 'higher degree' and the researcher could not yield favourable results through probing. All the managers from Radio and Television services had either journalism, media or communication training backgrounds. Transmission and ICT managers had engineering and computer technology training respectively while those in administration had arts, social sciences or humanities training backgrounds. Their training backgrounds coupled with years of relevant experience made them appropriate for the positions in which they were employed at the time of the study.

Tacit and Explicit Knowledge

During the interview, managers were asked to identify the type of knowledge that was more important in their organisations. The majority, 36 (97%), indicated that tacit knowledge was far more important than explicit knowledge. Only one (3%) manager suggested explicit category was important. However, all the 37 managers were quick to point out that both forms of knowledge were important for the organisations. Managers stated clearly that in broadcasting, being a dynamic industry, the tacit knowledge was more important than explicit knowledge as the employees react quickly to issues. According to Taylor (2007), individuals join an organisation with certain levels of knowledge and increase those levels of knowledge until they become familiar with their new roles and culture of the organisation. 'Tacit knowledge is closer to action', argued another manager. One manager from the Engineering section stated that staff in the section

relied on tacit knowledge for transmission because it is practical. Another one stated that the broadcasting industry is a creative, mobile and dynamic industry which relies on tacit knowledge and not explicit. A SABC manager from the marketing and sales section stated that one needs tacit knowledge when discussing issues with a client rather than to make references to recorded knowledge. Managers from administration sections such as Transport, Human Resource, Accounts and Stores all acknowledged the importance of explicit knowledge since they use recorded information that they need to fall back to when need arises and for reference purposes.

Risks of Losing Knowledge in the Broadcasting Organisations

Managers were asked to indicate some of the risks that they considered to be associated with loss of tacit knowledge in their organisations. One manager from the engineering department retorted that, "If we lose tacit knowledge we are doomed. People will suffer because they will not have information that they want". "When we maintain transmission equipment we do what is called modification so the next person should know what modification has been done**."** Another manager said, "Risks are very high…if you don't document; if the person leaves, also the knowledge is gone." This is consistent with literature surveyed where tacit knowledge is referred to as sticky while explicit is leaky and migratory (Turban *et al.,* 2008; Nemani, 2010). One of the ICT managers said: " losing tacit knowledge moves the whole organisation 'five years back at the same time affecting the vision and strategic planning of the organization," a view that is consistent with that of Mohammed *et al*. (2006) who point out that valuable knowledge is acquired through the number of years an individual spends in an organisation.

On the loss of strategic knowledge in the three public broadcasting organizations, managers made the following various comments, "organisation would be grounded", "work performance would be substandard", "continuity is affected", "negative impact on art, political and economic stories that broadcasting corporations produce", "challenges of retrieving information", "adverse effect on the chains of production", "output is not up to scratch", "radio and television listeners and viewers will note that the programmes are half-baked and do not have depth", "loss of knowledge creates a gap", "quality of work may deteriorate because we can't replace 20 years of experience." This confirms Levy's (2011) findings that many of those retiring nowadays have spent many years in the same organisation and some even in the same job such that there is a vast amount of knowledge to be transferred and retained.

These comments indicate that managers were quite conversant with possible ramifications associated with loss of organisational knowledge but surprisingly some of them took no initiatives to curb the knowledge losses. As one ZBC manager alluded to, loss of knowledgeable employees was well pronounced on the quality of broadcasting products that the organisation was producing following exodus of its experts in 2004 due to the restructuring and economic challenges in the country.

Knowledge Lost within the Last Five Years

Literature reviewed indicates that when experts leave an organisation they leave with their knowledge. Respondents were asked to identify expertise that had been lost from the organisations in the last five years. During interviews, managers revealed that the loss of knowledge was as a result of resignations, retirements, being fired/dismissed from work, deaths, ill health and so forth. The results of the findings are shown in table 1 below.

Table 1: Experts Who Left the Organisations

Experts	Left the organisation
Technicians	64%
Engineers	60.3%
Editors	55.3%
IT Specialists	50.9%
Accountants	44. %
Marketing Specialists	37.3%
Public Relations Officers	26.7%
Librarians	21.1%
Information Officers	19.9%
Communications Manager	19.9%
Researchers	16.8%
Archivists	14.9%
Documentalists	8.7%

Loss of tacit (personalised) knowledge takes place when the knowledgeable employees leave or

die while explicit (codified) knowledge is lost when organisational documents cannot be found (Dan, 2008; Taylor, 2007; Kim, 2005; and du Plessis, 2004) for one reason or another or when documents get destroyed in a disaster. Loss of technicians, engineers and editors was even supported during interviews by the managers. This confirms other studies (Wamundila & Ngulube, 2011, Phaladi, 2011; Levy, 2011 and Tennesse Valley Authority, 2007) that knowledge attrition is inevitable. Technicians seem to be mobile in the region due to their rare knowledge and skills in the broadcasting industry.

When asked to indicate "any others" who had left, the respondents indicated reporters, journalists, channel controllers, board members, top management, chief executive officers, producers, cameramen, technical operators, logistics officers, data capturers, audio operators, programmmes managers and photographers. Such high labour turnover means the public broadcasting organisations lose specialist knowledge which in some cases is the core to their business (Staplehurst and Ragsdell, 2010). The respondents gave answers with regards to the departments they were placed in the organisation and less on the general knowledge about the organisation.

Asked whether those who left were interviewed to capture their knowledge, respondents posted various comments such as; "not to my knowledge', "the organisation does not interview people when they leave", "sometimes people even leave without a goodbye", "HR conducts exit interviews", "not privy to the processes that happens after resigning" and "HR can provide more accurate statistics" written on the questionnaires. Interviews with managers revealed that some of the experts who departed held exit interviews with the Human Resource Department (HRD) for purely personnel matters on why they were leaving. Further asked in the interview about interviews to capture the knowledge of departing experts, managers indicated that the experts left under different circumstances. While some experts made sudden departures, some retired, some were fired, some were retrenched, some died and some disappeared never to return.

Sources of Tacit Knowledge to be Retained

Organisational tacit knowledge is viewed as the most important because it is linked to action. As such, a question was asked on the major sources of knowledge that have to be captured and retained in their organisations. The results are shown in the figure below:

Levy (2011) avers that determining the knowledge to be retained is one of the most important

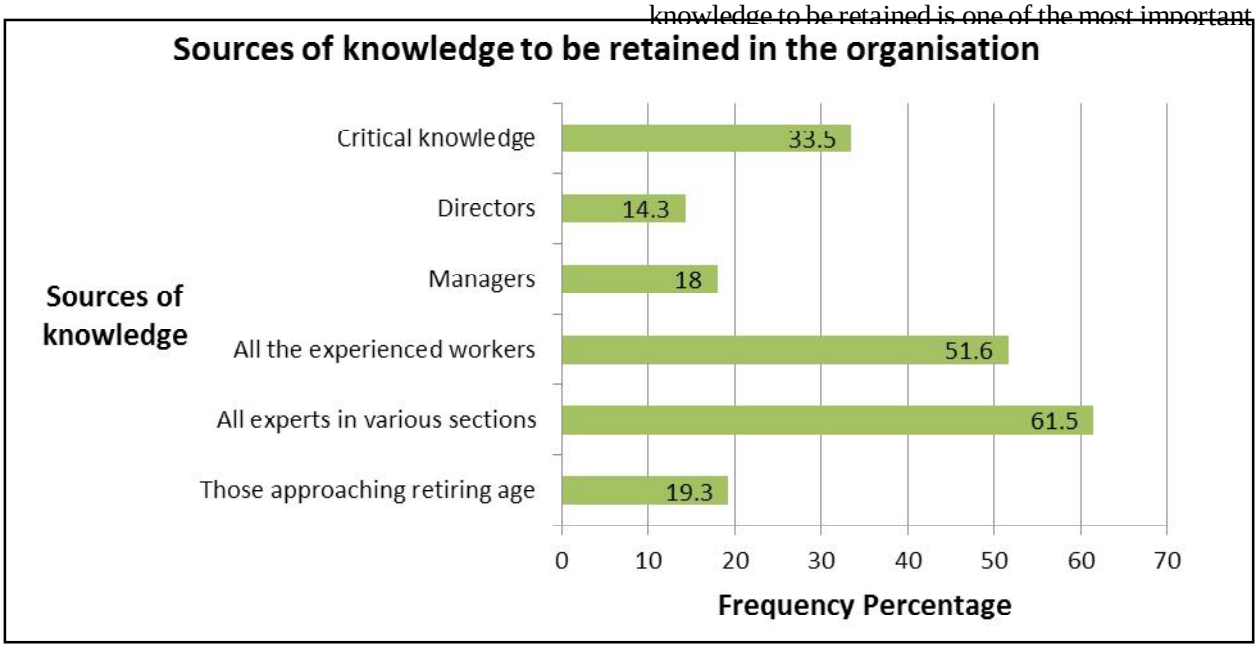

Figure 1: Knowledge to be retained in the organisation

tasks of knowledge retention projects while Nonaka and Takeuchi (1995) are of the opinion that tacit knowledge is the more important category of knowledge because it is used for innovation. Not all knowledge needs to be captured. Majority of the 99 (61.5%) respondents were of the view that knowledge of all experts in various sections needs to be captured but 83 (51.6%) suggested knowledge of all the experienced workers which is consistent with what Tennesse Valley Authority (2007) regards as the 'critical knowledge of veteran employees'. This finding is consistent with Young's (2006) assertion that the most irreplaceable, high risk areas are where your knowledge retention efforts need to be focused.

The remainder, 54 (33.33%) reported critical knowledge holders and 31(19.3%) respondents suggested those approaching retiring age had important knowledge. Twenty nine (17.9%) said managers and 23(14.19%) chose directors. Further asked on who were critical knowledge holders in their respective organisations, managers revealed that those who had been with the organisations for more than 20 years and were approaching retiring age, experts, experienced workers, directors and even new employees who possessed vital skills for the organisation to continue existing in their business.

Conclusions

The study found out that while both forms of knowledge were important for the functions of the three public broadcasting corporations, the majority of the managers valued tacit knowledge more than explicit knowledge. However, the two categories do complement each other. The HR, Administration, Transport, Finance and Accounts relied heavily on explicit knowledge while the other sections such as Engineering, Sales and Marketing, radio and television tasks used a lot of n tacit knowledge because of the innovation, creativity and dynamism associated with tacit knowledge.

The study found out that the broadcasting corporations suffer some inadequacies and performance gaps, poor productions, poor service delivery when they lose knowledge. Most of the gainers tend to be private and public organisations, and fellow broadcasting corporations in the region.

It was also found that in a period of five years, the three broadcasting corporations had lost technicians, engineers, journalists, reporters, accountants, presenters to competitors in the region and overseas. The worst affected was ZBC whose country had serious economic challenges that impacted negatively on the knowledge loss in the corporation. It emerged that most of its knowledgeable staff joined SABC and other broadcasting organisations in the region.

The study established that the experienced, highly skilled and those approaching retiring age were the most revered to possess valuable knowledge that was supposed to be retained. Such individuals included subject matter experts (SMEs), mentors in various broadcasting sections and those who had some apprentices.

From the findings, the study therefore recommends that the three broadcasting organisations should value both categories of knowledge and work towards the capture, sharing and retention of the two. Knowledge retention would assist the organisations when knowledge walks out of their doors through the loss of staff..

Moreover, the organisations should develop a culture of knowledge sharing to mitigate the risks of corporate knowledge loss. Knowledge shared is knowledge captured. The study also recommends that organisational knowledge capturing strategies (mentorship, subject matter experts, and storytelling) should be put in place to ensure that valuable and critical knowledge of the experienced, the skilled, the knowledgeable and the retirees is captured and retained in the organisation.

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Assessment of Digital Access Control Methods Used by Selected Academic Libraries in South-West Nigeria

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Abstract

This article is aimed at acquainting and equipping librarians and information professionals with the knowledge that would enable them establish an effective strategy to protect e-resources from such abuses as plagiarism, piracy and infringement of intellectual property rights. The descriptive survey was used, with questionnaire, observation and interview as data collection tools. A survey questionnaire was administered to librarians and library officers in five federal university libraries in Oyo, Osun, Ondo, Ogun and Lagos States. Findings revealed that none of the respondents was aware of anti-circumvention laws and digital rights management systems.

The study creates awareness about access control method(s), policies and regulations for the governance of, and use of e-resources. It is expected that such awareness would reduce litigations associated with abuse of e-resources while protecting the authors and the publishers' interests.

Keywords:
Academic Libraries, Digital Access Control, Digital Access, Digital Rights, E-Resources, Access Management, Nigeria

Introduction

Academic libraries tend to have very large collections of published materials spread across several faculties and departments. Formerly, academic library materials were composed mainly of audiovisuals and prints which users had to access physically in the library. However, with the advent of the computer and the Internet; library holdings are now available in electronic format. Examples include electronic journals, e-books, institutional repositories and more.

In Nigeria, academic libraries as the major repository of information are also catching the e-library fever, albeit at a slow pace. This new trend has increased circulation of published materials that ordinarily would have been accessed by users making physical trips to a traditional library. Consequently, the information management community is confronted with a whole range of challenges. Some of the challenges are how to control access to electronic materials, manage intellectual property right issues and resources protected by copyright (Rosenberg, 2005).

Therefore, a study on access control of the digital content of academic libraries is timely. This will expose methods currently in use by this group of libraries, and how effective they are. Such a study would also aid libraries in the formulation of polices that will eliminate bottlenecks, allow users to have access to published materials and put measures in place to protect library's resources from abuses like piracy, plagiarism, and at the same time enforce copyright issues.

This study focused on five federal universities, namely: Kenneth Dike Library, University of Ibadan

(KDL) founded in 1948, Nimbe Adedipe University Library (1988), Federal University of Agriculture, Abeokuta, Federal University of Technology Akure Library(1982), Hezekiah Oluwasanmi Library, Obafemi Awolowo University(1961) and University of Lagos library (1962). The study examined the methods employed by these academic libraries in controlling access to their electronic resources. The libraries are in five major states namely: Oyo, Osun, Ondo, Ogun and Lagos (South-western Nigeria). All the libraries selected for the study have large collections of both print and electronic resources.

Objectives of the Study

The general objective of this research work was to determine the access control methods used by academic libraries in the South-West zone of Nigeria and how effective these methods have been, with regards to access management and protection of library resources. The specific objectives were to:

1. evaluate access control methods used for e-resources in the selected university libraries.
2. determine the most reliable of these access control methods in the selected libraries.
3. determine the challenges and reliability of these methods.
4. review legal regulation or policies guiding access control of e-resources.

Review of Related Literature

Controlling access to electronic resources is often problematic. Controlling access is usually carried out by implementing processes such as identification, verification, authorisation and accountability in the access control system (Turban, Rainer &Potter, 2001). Some of the methods used in controlling access to digital resources by libraries are: user identification, internet protocol authentication and licensing policies.

User Identification and Authentication (ID/ Passwords): - It involves the use of user identification and password (ID/password). ID/password has to be issued for individual patrons or group of patrons in order to access journals, databases and other popular resources. This is being used for most of the electronic database services offered by academic libraries. Identification and authentication (I&A) is the process of verifying that an identity is bound to the entity (a user) that asserts it. The identification and authentication (I&A) process assumes that there was an initial vetting of the identity, during which subsequently, the entity asserts an identity together with an authenticator as a means for validation. The only requirement for the token of identification is that it must be unique within its security domain. Authentication is commonly based on at least one of these factors: such as a password or a personal identification number. This is based on the assumption that only the owner of the resource knows the password required accessing the resources (Olsen, 1995; CGIAR, 2009).

Internet Protocol Authentication: It is a means of identifying computer systems on a network. The IP address allocated to a computer is determined by the class of network (class A, B, C, etc.) on which it is located. That is the type of network implemented by the library or the parent body. Each network class has a range of IP addresses reserved for computer systems on its network. The use of IP authentication involves verifying that the IP addresses of user terminals or systems connected or accessing the library's network or e-resources falls within the IP range of the library or parent body of the library. This method is less intrusive and the preferred mode for most libraries in the developed world because there is no need to give out passwords to users. Hence, libraries do not have to manage changing passwords mandated by providers. Despite these advantages, access control through IP authentication remains a concern for large academic libraries for the following reasons: Since Internet service in most universities in Nigeria is not reliable, many students and academic staff use other Internet service providers. As a result, they have IP addresses that are not within the IP range of the university. They use IP addresses provided to them by other Internet Service Providers (ISPs). Alternative provision such as the use of proxy servers that identify genuine library users on other authentication schemes must be put into place. Also, many universities are now adopting the use of dynamic IPs ("live IPs"), instead of the old static IP address systems. With the new system, users are given temporary IP addresses. These systems dynamically assign IP addresses. Though these systems are economic for the communications

and computing centres for the universities, however, resolving IP conflicts and other network problems become more problematic for libraries since IP addresses are now dynamic and not always static like before.

Licensing Policies: This involves the use of rules or regulations (policies) to guide the use of electronic resources. Some service providers or aggregators use licensing policies to check access to web sites and electronic resource. There are also policies restricting members of the university community not resident on the main campus. In spite of the varying distant locations, these members of the university community also have equal rights as well as same access privileges and capabilities as their counterparts residing in the main campus. However, with restriction by site they could be denied the same privileges and capabilities their on-campus counterparts have with regard to information access. An example of this is the distance learning students of the University of Ibadan (Brennan et al., 1997, Teets & Murray 2006, Armstrong et al., 2002).

There are many legal regulations guiding the use of e-resources. This is because digital content is increasingly protected by several layers of intertwined legal and technological devices – copyright law, licensing agreements, computer systems and applications, and criminalising anti-circumvention laws. In the digital environment, there are basically four types of protection. These are copyright, licenses, DRMSs and anti-circumvention laws.

Copyright Law: Copyright shield digital content from abuse, it is a legal procedure granting the creator of a recorded work series of rights over the work created. The rights over the work created restrict users from duplicating, distributing, performing, and alteration of the protected work (Prytherch, 2000). The fair dealing exemption is a condition in copyright law that permits the reproduction of a single copy of otherwise protected works for criticism, review or private study (Keenan & Johnston, 2000). According to Amen et al. (2002), the fair dealing exemption authorise free replication of information provided the derived material is used for research, criticism, teaching, in such a way that it will not affect with the rights of the copyright holders. The South African Copyright Act 98 of 1978 stipulates in sections 12(1) explains that Copyright shall not be infringed if a literary or musical work is used solely and then only to the extent reasonably necessary, such as, research or private study, review, reporting current events ,in a newspaper, magazine periodical and/or for broadcasting or in a cinematography. Provided the user of the work is not of the notion that, according to the provisions of section 13, that the word 'used' is not authorising the reproduction of a copy of the work or a large part of the work in question and as stated in paragraphs (b) and (c) (i) of the statues that the source and the author's name are mentioned, if it appears on the work. (South Africa Statutes, 2000:220; Copeling, 1978:41). The above law is also similar to the Nigerian Copyright Act Decree No. 98 1998.

Licenses and Anti-circumvention Laws - Access to digital content is in practice, governed by access licences. This is due to the benefits and ease of access to digital information, (McCracken, 2004). The access license is a form of contract between the library and a vendor, which is normally written by the aggregator, which most of the time is in favour of the aggregator **(**Wyatt, 2005). The anti-circumvention condition disallow breaking of safety measures put in place to control access digital content (Braunstein, 2000). The United States of America took the lead in evolving its anti-circumvention clause in the Digital Millennium Copyright Act (DMCA) 1998 in section 1201 (DMCA 1998), and nations such as Australia and the United Kingdom have followed. The Australian Digital Agenda Act 2000 emulated the DMCA 1998 by instituting section 116A that forbids any form of circumvention (Lahore & Rothnie, 2004**).** In the United Kingdom, just as in USA and Australia, section 296 of the Copyright Designs and Patents Act 1988 forbids circumvention of digital content (United Kingdom Copyright, Designs and Patents Act 1988 (c.48), 2000). This law is also being gradually adopted by developing nations in Africa with South Africa at the fore front (Masango, 2007).

Digital Right Management System- Digital Rights Management System (DRMS) is a technical barrier, which is also protected by anti-circumvention law, and is a security measure protecting digital content. This access control measure (various versions of DRMSs) is known as automated rights management (ARM). It is another form of protection

for digital content, as DRMS seek to check unauthorised reproduction of copyrighted materials and can restrict copying unless the user make some payment. The DRMS that is buried within the digital code of copyrighted material has the ability to allow copies of copyrighted materials to be made upon payment (Liebowitz, 2002). In addition, the DRMS controls access to digital content, averts illegal reproduction of digital content, recognise digital content and the owners of such licences, and also ensures that the identification data are authentic (Bygrave, 2002).

Methods

The descriptive survey was used for this study. Descriptive survey attempts to picture or document current conditions or attitudes, i.e. describe what exists at the moment (Aina, 2002). This research method has been adopted to help determine the access control methods in five selected academic libraries and how adequate these methods have been. The instruments adopted for this study are questionnaire, observation and interview. The questionnaire and interview are the main instruments for this study. A questionnaire was designed and administered for completion by librarians and library officers in five university libraries (federal universities) in Oyo, Osun, Ondo, Ogun and Lagos states. Data received from the questionnaire was augmented by on-site visits, observations and discussions with key informant (interviews).The Questionnaire was distributed to one hundred (100) information professionals. Seventy-five copies of the questionnaire were retrieved but only sixty-seven was valid for data analysis, making the response rate sixty-seven percent. The statistical techniques used were percentage and frequency distribution. The data was analysed using Software Package for Social Sciences (SPSS).

Study Population

The population for this study was made up of information professionals in five selected university libraries. This consists of reference librarians, systems librarian, acquisition librarians, cataloguers/cataloguing librarians, serials librarian and library officers. The library staff was selected because they are involved directly or indirectly in digital access control and are most informed about the acquisition, administration and management of e-resources. After visiting federal universities in the south-west zone of Nigeria, the following universities namely University of Ibadan, Obafemi Awolowo University, University of Lagos, Federal University of Technology Akure and Federal University of Agriculture, Ogun State were purposively selected because they all have e-resources at the time this study was conducted. The only federal university library in this zone excluded from the study is the Federal University, Oye,Ekiti, which was barely one year old at the time of study, thus had limited e-resources. State or private universities were not considered because of the time constraint and limited resources in carrying out the study. Table 1 presents the universities selected for the study.

Findings of the Study

Table 1: Selected Universities for Study

University	No. of Library Staff in Survey	Percentage
University of Ibadan, Oyo State	17	17 (25.4%)
University of Lagos, Lagos State	13	17 (25.4%)
Obafemi Awolwo University, Osun State	17	13 (19.4%)
Federal University of Technology, Akure, Ondo State	10	10 (14.9%)
Federal University of Agriculture, Ogun State	10	10 (14.9%)
Total	**67**	**100%**

The distribution of the respondents by post who were involved in access control of e-resources has been provided in table 2.The table shows that a variety of librarians were involved in access control, cataloguing (46.3%) and serial librarians (17.9%) being the prominent users.

As indicated in table 3, the most popular access control method is the use of username and password

Table 2: Distribution of Respondents by Post N= 67

Selected University Libraries	Cataloguer	System Librarian	Acquisition Librarian	Reference Librarian	Serial Librarian	Library Officer	Total
Kenneth Dike Library University of Ibadan, Oyo State	7(10.4%)	3(4.5%)	2(3.0%)	1(1.5%)	1(1.5%)	3(4.5%)	**17(25.4%)**
Hezekiah Oluwasanmi Library, O.A.U, Osun State	7(10.4%)	3(4.5%)	2(3.0%)	1(1.5%)	0(0%)	4(6.0%)	**17(25.4%)**
University of Lagos Library	8(11.9%)	2(3.0%)	0(0%)	1(1.5%)	0(0%)	2(3.0%)	**13(19.4%)**
Federal University of Technology Library Akure, Ondo State	5(7.5%)	3(4.5%)	1(1.5%)	0(0%)	0(0%)	1(1.5%)	**10(14.9%)**
Federal University of Agriculture library Abeokuta, Ogun state	4(6.0%)	1(1.5%)	1(1.5%)	2(3.0%)	1(1.5%)	1(1.5%)	**10(14.9%)**
Total	**31(46.3%)**	**12(17.9%)**	**6(9.0%)**	**5(7.5%)**	**2(3.0%)**	**11(16.4%)**	**67(100%)**

Control of Access to E-resources

The various methods used to control access to e-resources in the university libraries under study are presented in table 3. The academic libraries used a combination of methods to safeguard the digital contents and screen impostors. These include IP authentication, User name and password, policies and regulations and to a less extent, the firewall.

Table 3: Methods Adopted to Control Access to E-Resources as Identified by Respondents

Selected University Libraries	Username & Password	IP Authentication	Policies & Regulations	Firewall	All of the above	Total
Kenneth Dike Library University of Ibadan, Oyo State	6(9.0%)	4(6.0%)	1(1.5%)	3(4.4%)	3(4.5%)	17(25.4%)
Hezekiah Oluwasanmi Library, O.A.U, Osun State	5(7.4%)	2(3.0%)	5(7.4%)	2(3.0%)	3(4.5%)	17(25.4%)
University of Lagos Library	4(6.0%)	5(7.4%)	2(3.0%)	1(1.5%)	1(1.5%)	13(19.4%)
Federal University of Technology Library Akure, Ondo State	4(6.0%)	4(6.0%)	1(1.5%)	1(1.5%)	0(0%)	10(14.9%)
Federal University of Agriculture library Abeokuta, Ogun state	4(6.0%)	3(4.5%)	3 (4.5%)	0(0%)	0(0%)	10(14.9%)
Total	**23(34.4%)**	**18(26.9%)**	**12(17.9%)**	**7(10.4%)**	**7(10.4%)**	**67(100%)**

(34.4%), followed by IP authentication (26.9%) and Policies/regulations (17.9%). The use of Firewall (10.4%) for screening out impostors was the least used by the libraries. Four out of the selected libraries, namely: Kenneth Dike Library, UI, Hezekiah Oluwasanmi Library, University of Lagos Library and the Library of the Federal University of technology used the four access control methods with the exception of the Federal University of Agriculture Abeokuta.

Respondents' opinions about reliable methods in terms of controlling access to e-resources are presented in table 4. According to the table, over 50% of the respondents were of the opinion that Username and Password combination was the most reliable of all the methods. The use of policies and regulations was indicated as the least reliable of the four methods.

Reliability of the Methods of Access Control

Table 4: Reliability of Methods of Access Control

Selected University Libraries	Username & Password	IP Authentication	Policies& Regulations	Firewall	Total
Kenneth Dike Library University of Ibadan, Oyo State	9(13.5%)	3(4.5%)	2(3.0%)	3(4.5%)	17(25.4%)
Hezekiah Oluwasanmi Library, O.A.U, Osun State	7(10.4%)	4(5.9%)	1(1.5%)	5(7.4%)	17(25.4%)
University of Lagos Library	8(11.9%)	3(4.5%)	2(3.0%)	0(0%)	13(19.4%)
Federal University of Technology Library Akure, Ondo State	6(9.0%)	2(3.0%)	1(1.5%)	1(1.5%)	10(14.9%)
Federal University of Agriculture library Abeokuta, Ogun state	7(10.4%)	2(3.0%)	0(0%)	1(1.5%)	10(14.9%)
Total	**37(55.2%)**	**14(20.9%)**	**6(9.0%)**	**10(14.9%)**	**67(100%)**

Challenges Faced When Using the Methods

Some of the problems encountered by the five libraries when implementing access control measures for e-resources are presented in table 5.

It was observed that respondents indicated "technology problem" as a major challenge constituted 32.8%, "frequent change of password by service providers, (31.3%) and other challenges (19.4%) as shown in table 5.

Table 5: Challenges Faced in using these Access Control Methods for E-Resources

Selected University Libraries	Technology Problem	Frequent Change of password by service providers	Dearth of Staff with adequate knowledge of Access Management	Others(Librarie s not having a say in Access Policies)	Total
Kenneth Dike Library University of Ibadan, Oyo State	8(11.9%)	6(9.0%)	2(3.0%)	1(1.5%)	17(25.4%)
Hezekiah Oluwasanmi Library, O.A.U, Osun State	6(9.0%)	4(5.9%)	3(4.5%)	4(5.9%)	17(25.4%)
University of Lagos Library	4(5.9%)	7(10.4%)	2(3.0%)	0(0%)	13(19.4%)
Federal University of Technology Library Akure, Ondo State	2(3.0%)	1(1.5%)	1(1.5%)	6(9.0%)	10(14.9%)
Federal University of Agriculture library Abeokuta, Ogun state	2(3.0%)	3(4.5%)	3(4.5%)	2(3.0%)	10(14.9%)
Total	**22(32.8%)**	**21(31.3%)**	**11(16.4%)**	**13(19.4%)**	**67(100%)**

Legal Regulations/Policies Guiding Access Control to E-Resources

Table 6 presents information on legal regulations and policies guiding access control in the five libraries. It was observed that a large percentage of respondents from the selected libraries made use of rules and regulations. The use of rules and regulations was the most popular.

Table 6: Legal Regulations and Policies Guiding Access Control of Library Materials

Method	Frequency	Percentage
Rules/Regulation	28	41.8
Licence	14	20.9
Fair Use Law	11	16.4
Copyright Law	14	20.9
Others (Anti-circumvention, etc)	0	0.0
Total	**67**	**100.0**

Discussions

Analysis of data showed that majority of the libraries under study used more than one method when controlling access to e-resources. This is revealed in table 3. This implies that most of the libraries use more than one method. The four access control methods (Username and password, IP authentication, Fire wall and policies) identified by this study are being used by four out of the five selected libraries. While the fifth library, Federal University of Agriculture Library has adopted only three out of the four methods, it has not adopted the use of firewall for controlling access to its e-resources. The use of a single method has been identified as not a reliable approach for screening impostors from e-resources. However, most of the libraries under study made use of user name and password as major criteria for accessing e-resources. Interestingly, the most used legal regulation (41.8%) in controlling access to e-resources is rules and regulations.

A major challenge (see table 5), of controlling access to e-resource is technology problems (32.8%) this included infrastructural problems like technology failures and conflicting IPs. When there is technology failure (like unreliable internet services) students and

faculty staff often use other service providers and as a result, do not have IP addresses within the IP range of the university. Instead, they used addresses provided to them by other Internet Service Providers (ISPs).With this challenge monitoring logs becomes impossible and conflicting IPs can frustrate both the users and the library, because access to e-resources will be erratic. Apart from technology problems, there is "Frequent Change of Passwords by service providers" (31.3%); this happens as a result of abuse by users. While other challenges encountered by these libraries included scarcity of staff with adequate knowledge of access management, there was nobody in the libraries checking logs for local databases. Also, most of the libraries just conform to policies put in place for access control by publishers or service providers.

Conclusion and Recommendations

None of the respondents was aware of Digital Right Management Systems (DRMS). It is important that academic library management educate library professionals on the legal regulations governing the access to electronic resources in each library. Also a handbook on legal regulations governing access to e-resources should be published and made available for use in academic libraries and library schools. This could be used as resource material for library orientation and also for training young librarians in the library schools.

The study also reveals that some of the policies used by the libraries require review. In all the libraries, these policies did not cover issues like a library user within a university community giving his or her password to an outsider. Most of the time, these policies totally exclude undergraduate students or distance learning students from the use some of the libraries e-resources which may be very useful in their course of study.

The following suggestions are made for improved digital access control in academic libraries. Academic libraries in Nigeria should give access control and management of e-resources adequate attention by:

- Reviewing existing library policies, rules and regulations on access control of e- resource.
- Education of library professionals and users on the legal regulations governing the use of e-resources.
- Courses on legal regulations of library materials which can be included in the curriculum of library schools and users can be informed about these regulations and the implication of not complying with them.
- Implementing access control measures and interfaces that will maximise use of e-resources.
- Training library staff on access management of e-resources.

Finally, it is hoped that this study will stir up more research activities and increase awareness, as well as the change required in access control management of e-resources in academic libraries in Nigeria.

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Short Communication

Health Information Systems in Tanzania

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Abstract

Health Information Systems (HIS) constitute data compilation, reporting, dispensation and the use of information for better health service delivery at all levels. In Tanzania, health service is organised into three components (USAID, 2007): the district (the district hospital, health centres, dispensaries, and community health services), secondary and tertiary hospitals and other tertiary-level institutions (teaching institutions), and the central level which provides support services such as policy-making, donor coordination, monitoring and evaluation. The government of Tanzania is aware that improved HIS facilitates proper decision making regarding health care delivery. Using secondary data, this article discusses the application of information systems to improve health services delivery in Tanzania. Moreover, the article highlights the significance of digitally-based health information system in health care delivery.

Keywords:

Information Systems, Tanzania, Health Information Systems.

Introduction

The World Health Organisation (WHO) considers health systems to include the organisations, institutions, and resources that are devoted to producing health actions. They include a range of players engaged in the provision and financing of health services such as public, non-profit, and for-profit private sectors, as well as international and bilateral donors, foundations, and voluntary organisations that are involved in funding or implementing health activities. Health systems can be found at: regional, district, central, community, and household levels (WHOHMN, 2007).

In the context of Tanzania, the Health Management Information System (HMIS) is considered to be a single biggest system for health data. HMIS operates under the Ministry of Health and Social Welfare (MoHSW). It collects health information from more than 5,400 health facilities (WHO, 2000). Due to the new health policy of having a dispensary in each village, a health centre for each ward and a hospital for each district, it is anticipated that in ten years the numbers of the current health facilities will be doubled (United Republic of Tanzania, 2010).

The Tanzanian MoHSW has decided to adopt the HMN framework in strengthening HIS. Consequently, any health support is expected to follow this framework including the Norway-Tanzania Partnership Initiative (NTPI). NTPI has two pillars of health data. The first is population-based health sources that include data which are generated from the population as a whole. The second is health service-based sources or Health Management Information System (HMIS). In this category, data is collected through health-related administrative and operational activities. Such data include health service-based data: health facility

based data on morbidity and mortality; types of services delivered, drugs and commodities provided; information on the availability and quality of services; and financial and management (e.g. human resource, logistics) amongst others. Health administrative records generate data on the overall functioning of the health system such as the availability of human resources, infrastructure and commodities as well as financial flows ((United Republic of Tanzania, 2010).

Health systems in Tanzania are organised into three components (USAID, 2007): the district (the district hospital, health centres, dispensaries, and community health services), secondary and tertiary hospitals and other tertiary-level institutions (teaching institutions), and the central level which provides support services such as policy-making, donor coordination, monitoring and evaluation.

Health Sector in Tanzania

According to the World Bank, Tanzania is the fifth most dangerous country in Africa where a woman can give birth (after Sierra Leone, Niger, Malawi and Angola). Statistics reveal that each day Tanzania is losing an average of 36 women to childbirth, plus 430 babies aged less than a year old (United Republic of Tanzania (URT), 2010). On the whole, the health sector in Tanzania is experiencing significant challenges, primarily due to several underlying causes.

People are resorting to traditional health support, increased demand for data processing along with the expectation of consistent quality of service across the health system and the entire country, a continuous need for cost-containment in health service delivery in the context of changing disease patterns (for example, lifestyle diseases), emerging specialisations and variations of relative disease burdens, a continuous shortage of health workers, especially in the rural areas. The expectations and demand for health care services are increasing as a result of population growth and increased mobility exacerbated by continuous rural-to-urban migration. Also, the new generation of staff entering the health and social welfare workforce, already equipped with ICT skills cannot be persuaded to learn how to work in an inefficient and unconnected environment. Such group of health professionals prefers to simply migrate into any workplace where the mix of their ICT skills and professional competencies will be both respected and rewarded (URT, 2010). In Tanzania as in most parts of the developing world, globalisation places pressure on health care systems to align themselves with international developments and standards. .

ICTs and HIS in Tanzania

According to Hennessy et al., (2010), ICTs offer opportunities to stimulate growth and enhance innovation by individuals and institutions. However, to realise the full potential of ICTs in the health sector, there is a need to create an environment that will allow the proper harnessing and utilisation of ICTs. This includes adoption and integration of ICTs in various health programmes. This will increase the level of awareness of the potential of ICTs for authentic and sustainable health service delivery.

Tanzania, like many other African countries, has adopted ICT as an important tool for attaining development in various aspects. Nevertheless, Swarts & Wachira (2010) note that there are a number of indicators which show that the government and its political commitment to ICTs are critical for the successful integration of ICTs in the health sector. This is a necessary step because without government's commitment, it is difficult to create an environment (both legal, political and regulatory) for ICTs to flourish.

A primary indicator of the Tanzanian government's commitment to the use of ICT is the formulation of policies that guide the utilisation of ICT in health sector and other areas throughout the country. These policies include the National ICT Policy, National Vision 2025 and National Strategy Growth and Reduction of Poverty (NSGRP). In all these policy documents, ICT is outlined as a powerful development facilitator in the fight against poverty, ignorance and disease. Besides, Tanzania's government has allocated funds for ICT infrastructure and promotes its utilisation in various sectors. The government has also sets standards in order to ensure compatibility and encourage all sectors to invest in ICT development. The government has also in cooperation with the UN established the Tanzania Knowledge Network (TAKNET) launched in 2009, with the purpose of

creating, sharing and applying knowledge in critical development areas such as the health sector and in enhancing the livelihood of the rural communities (Swarts & Wachira, 2010). Moreover, an exemption of tax on personal computers has been introduced and this has served as an incentive for ICT purchase. Finally, the government has put in place telecommunication regulatory measures such as licensing operators, partial/full privatisation of government-owned operators and the involvement of the private sector as telecommunications operators. This has resulted in greater fulfilled demands and increased ICTs access, driven by the establishment of an independent regulatory agency (Katunzi, 2009). The ICT health policy of Tanzania aims to develop and deploy nationwide ehealth systems that will support medical facilities in various areas. It is acknowledged by government that ICT can be used in health services to manage health care systems for preventive and curative services (Lucas, 2008). These initiatives show the government's political will and commitment to ICT deployment in its space, including the health sector.

The importance of ICT deployment in the health sector need not be over-emphasised. Jomoh and Salawu (2009) point out that proper utilisation of ICT in the health sector in Tanzania will increase access to health information, facilitate monitoring and diagnosis of patient's health problems. Furthermore, ICTs will enhance delivery of basic and in-service training for health workers and increase access of rural care givers to health specialists. The end result of all these could be the reduction of child and maternal mortality, combating Malaria, HIV and AIDS and other diseases. This can be done cost effectively if the government works to reduce costs of bandwidth by at least 30% compared to the current market tariffs while providing specialised and secure connectivity solutions to its members (Jimoh & Salawu, 2009).

eHealth Policy in Tanzania

All Tanzania sectors are compelled to operate within the framework of the National Development Vision 2025, against which all policies have subsequently been aligned. The Government has recognised the importance of ICT in fulfilling this vision. The central objective of Tanzania's eHealth policy, established in 2009, is "to develop and deploy a nationwide eHealth system that supports medical facilities in the under-served areas". Coupled with this objective is the policy statement which asserts: "The Government will promote the use of ICT to enhance efficiency, effectiveness and sustainability in the provision of services and basic utilities by supporting the development and deployment of nationwide e-health […] transactions." The policy articulates that eHealth can be divided into three categories: Telemedicine (i.e. 'care at distance') which enables medical consultations to take place by using ICT facilities to interconnect either the remote and local practitioners among themselves, or to engage directly between remote practitioners and their local patients; Health informatics that deals with health data gathered routinely from the day-to-day administrative, diagnostic and therapeutic processes of the health facilities, and eLearning or blended learning which has to do with using ICT for learning and knowledge exchange (URT, 2010).

In order for eHealth to be deployed effectively the network infrastructure is of critical importance. However, the policy argues that ICT infrastructure is not the main problem anymore. Small computers and (smart) phones are becoming more available and cheaper. They use simple power solutions and are becoming accessible to the general population. Most parts of Tanzania are covered with mobile networks and mobile Internet connectivity, which is sufficient to implement most of the eHealth strategy. Fibre optic, wireless solutions and satellite communication are already connecting a number of health facilities, and their numbers will increase rapidly in the near future. What is needed is to set standards and guidelines to assure interoperability of ICT in both clinical and administrative uses. Furthermore, the need remains rolling out and further improving existing ICT applications, while assuring that the health workers, especially in the field, are able to deploy ICT to improve their work and enhance health service delivery to the people (URT, 2010).

Challenges of Health Information System in Tanzania

It has been discussed earlier, Tanzania has put significant effort to transform the existing paper-based data health management information systems

into digital systems. However, introducing such ICT based initiatives to transform existing paper-based data collection tools and systems in public health institutions has come with a number of challenges such as: inadequate skills and knowledge at a local level to handle new systems and technologies; the lack of adequate financial resources, unequal infrastructural development, and political and bureaucratic constraints.

Generally, the challenge facing weak health systems including those in Tanzania is how to deliver proper health information and services. According to previous research, experiences from rural areas such as Morogoro, Bagamoyo, and Lindi in Tanzania is the poor communication networks that health workers are confronted with in delivering information on health control, and maternal and child health (Mushi & Chilimo, 2011). In order to address these challenges, the government should not underestimate investment in ICT initiatives. For this to be effective, public private partnership strategy is quite important.

Conclusion and Recommendations

Tanzania has a predominantly rural population of subsistence farmers who mainly speak local languages and Swahili, while most of the information on health services from practitioners and the academic research is available in English. Given this situation, there is a need for reliable, up-to-date, locally relevant information in local languages and Swahili. This means that in order to increase efficiency of information system, the government should ensure that most of the relevant health information is available and accessible in local language especially Swahili which is spoken by the majority.

To a greater extent, most ICT facilities are found in district hospitals in Tanzania. Hoever, the fact that the large population of the Tanzanians live in rural areas suggests the need for the government to increase connectivity in the rural communities to allow investment on ICTs in rural areas. The government should advance the use of mobile phone networks to help rural communities to access health information.

Any successful HIS development and implementation must begin with a detailed account of various contextual factors and issues that have been identified and emphasised by researchers and practitioners. In this regard, the government should make use of those research findings and see how those recommendations can be implemented (Mushi & Chilimo, 2011, Jimoh & Salawu, 2009 and Lucas, 2009).

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