

AFRICAN JOURNAL OF LIBRARY, ARCHIVES AND INFORMATION SCIENCE

VOLUME 11 NUMBER 2 OCTOBER 2001

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Trends in Library and Information Science Research in Africa, 1991-2000

Iyabo Mabawonku

Department of Library, Archival and Information Studies

University of Ibadan

Ibadan, Nigeria

Email: dpc@skannet.com

Abstract

An analysis of the papers published in the African Journal of Library, Archives and Information Science (AJLAIS) during the 1996-2000 period was carried out with respect to the country of submission of papers, place of professional training of authors, major disciplines covered in the profession, format of publication cited, time-span of citations and ranking of journals cited. The aim was to determine the changing pattern in Library and Information Science (LIS) research in Africa. The findings were compared to a similar analysis carried out for papers published between 1991 and 1995. The findings reveal that more papers were published in information science and archives than the previous period, and research papers focusing on continental issues diminished during the latter period compared to the previous period. Also, most of the researchers used more up-to-date publications during the 1996-2000 period than the previous period. LIS researchers in Africa overwhelmingly cited papers published in the UK and USA, as both countries published 62% of the papers cited during 1996-2000 as compared to 50% of publications that were published by both countries during 1991-1995.

Introduction

The literature of the information profession in Africa is not static. Like any other profession, research studies are continually being investigated in order to develop the profession. And these research findings are disseminated through various outlets, especially journals. The literature of many disciplines has been subjected, over the years, to bibliometric studies. In Africa, many bibliometric studies have also been carried out in many disciplines but there are very few on Library and Information Science (LIS) in the continent. Aina (1991) carried out a bibliometric analysis of LIS research papers published in three international journals, *International Library Review* (now *International Information and Library Review*), *Libri* and *Information Development*, between 1985 and

1989. The variables analysed were status of authors, gender of authors, types of research, geographical location of authors, coverage of subject areas, formats of citations and a ranking of journals consulted. The findings revealed that researchers cited more serial literature than non-serial literature papers, that is, publications other than journals. Most of the papers cited were mainly those published in the UK and USA. Authors from Nigeria constituted more than 65% of all the authors that published LIS research papers in Africa. Most of the research findings reported were descriptive and only 14.9% of the papers were as a result of empirical research. Alemna and Badu (1994) carried out a follow-up study in which they analysed the same source journals between 1990 and 1992. Most of their findings confirmed the earlier study by Aina, except that unlike in the previous study, only 41.7% of the authors of LIS research papers in Africa were from Nigeria. Also, the *International Information and Library Review*, which was ranked as the second most cited journal by LIS researchers in Africa, was ranked first in the study by Alemna and Badu.

While Aina (1991), and Alemna and Badu (1994) analysed three international journals published outside the continent, Alemna (1996) analysed all the papers published in the *African Journal of Library, Archives and Information Science (AJLAIS)*, 1991-1995 using the same bibliometric analysis. The variables studied were status, gender and geographic locations of the authors of papers in the journal and types of research subject areas covered. Aina and Mabawonku (1997) analysed the same set of papers using different parameters. These include distribution of the papers published per year, country of submission of papers, researchers' places of professional training, coverage of major disciplines of the information profession, geographical scope of research, formats of publications cited, time-span of citations and a ranking of the journals cited. The findings revealed that most papers published came from Nigeria (45%) and authors in 12 countries were responsible for all the papers published during the period considered. Over 75% of the authors had their professional training in Nigeria, UK and USA. Most of the papers published were in librarianship and the papers reported mainly on national issues. Only 26.5% of the papers were continental in scope. Most of the papers cited were non-serial literature (58.6%), although journal was the single most cited format (41.4%). Majority of the papers cited were published within 10 years of publication. The journals cited most were the *Nigerian Libraries*, *IFLA Journal*, *International Library Review* (now *International Information and Library Review*), *African Journal of Library, Archives and Information Science* and *College and Research Libraries*.

Given the fact that this was done five years ago, it was only appropriate to find out if the trend observed during the 1991-1995 period still persists or whether there have been changes since then. Hence, the main objective of this study was to compare the two periods (1991-1995) and (1996-2000) by analysing the papers published in AJLAIS during the latter period using the same parameters. The findings of the two periods would be compared, in order to be able to judge the trend of research and publication in LIS profession in Africa.

Methodology

All the papers published in the *African Journal of Library, Archives and Information Science* between 1996 and 2000 were analysed using bibliometric research techniques. In all, 81 papers were published during the period covered. These papers constituted the database used for this study. For each parameter analysed, it was compared with the previous period (1991-1995). The variables studied were country of submission of papers (only the country of the first author was recorded), place of professional training (more than one may be applicable with some authors), major disciplines covered in the profession, format of publication cited, time-span of citations and ranking of journals cited.

Findings

Table 1 shows the distribution of papers according to the country of submission of published papers. Authors from 14 countries, published during the 1996-2000 period unlike the previous period when contribution was from authors in 12 countries. In both periods, Nigeria constituted the largest single producer of LIS research. This is consistent with other bibliometric studies on LIS research in Africa. Ghana, Botswana, Kenya and South Africa still remain the centres of LIS research in Africa in both periods. These four countries along with Nigeria constituted the top five countries in LIS research in Africa. According to table 2, the findings show that, as during the 1991-1995 period Nigeria, UK and USA still remain the major places of professional training of authors of papers published during 1996-2000 period. The three countries (75.46%) accounted for the places of professional training of the authors of publications during the 1991-1995 period and 67.2% during the 1996-2000 period. It is remarkable that most of the researchers were trained in Africa. While only 33.6% of the authors who published between 1991 and 1995 were trained outside the continent (UK, USA and Canada), it only increased marginally to 37.3% in 1996-2000. The countries were UK, USA, Canada and India. The

overwhelming majority of authors who published during the two periods were trained in Africa. Table 3 also shows that while papers between 1991 and 1995 were overwhelmingly on librarianship (77.5%), the proportion of librarianship papers during the 1996-2000 period considerably reduced as librarianship papers constituted 43.2%. There was a substantial increase (from 11% to 35%) in the number of information science papers. There was also a significant increase in the number of papers on archives and publishing.

Table 1: Distribution of papers according to the country of submission per year

Country	1996	1997	1998	1999	2000	Total	1996-2000 %	1991-1995 %
Nigeria	7	7	10	7	5	36	44.4	45.00
Ghana	1	-	2	1	4	8	9.90	8.75
Botswana	1	-	-	4	2	7	8.60	10.00
Kenya	1	2	1	-	3	7	8.60	10.00
South Africa	1	2	1	1	2	7	8.60	8.75
Lesotho	1	2	-	-	-	3	3.70	1.25
Tanzania	1	1	-	1	-	3	3.70	2.50
Zambia	-	1	1	-	1	3	3.70	6.25
Swaziland	-	-	-	2	-	2	2.50	1.25
Cameroon	-	-	1	-	-	1	1.25	-
Canada	-	-	-	1	-	1	1.25	-
Ethiopia	1	-	-	-	-	1	1.25	3.75
Malawi	1	-	-	-	-	1	1.25	1.25
Zimbabwe	-	-	-	-	1	1	1.25	1.25
Total	15	15	16	17	18	81	100.0	100.0

The geographical scope of papers published during the period is also revealing. As shown in table 4, national focused papers still remain the area of concentration of the authors. Just as the 1991-1995 period, when national focused papers constituted 60% of all the articles, the same pattern was obtained during the period. This study also revealed that there was a substantial increase in the number of national focused papers, as this constituted 65% during the 1996-2000 period. Continental focused papers were however reduced during this period, because, unlike the 1991-1995 period, when continental focused papers constituted 26.5% of LIS research in Africa, the proportion was considerably reduced during the 1996-2000 period, as they constituted only 18.5%. There was also a

substantial increase in the number of regional focused papers. The tendency of LIS researchers in Africa to concentrate mainly on local issues has been criticised by Marcos (1991).

Table 2: Distribution according to researchers' place of professional training

Country	1996-2000			1991- 1995		
	No.	%	Cumulative %	No.	%	Cumulative %
Nigeria	50	39.1	39.1	44	40.00	40.0
UK	22	17.2	56.3	27	24.55	64.55
USA	14	10.9	67.2	12	10.91	75.46
Ghana	14	10.9	78.1	8	7.27	82.73
South Africa	8	6.3	84.4	9	8.18	91.91
Canada	7	5.5	89.9	1	0.91	92.82
Ethiopia	4	3.1	93.0	1	0.91	93.73
Zambia	4	3.1	96.1	6	5.45	98.18
Kenya	3	2.3	98.4	-	-	98.18
Botswana	1	0.8	99.2	-	-	98.18
Uganda	1	0.8	100.0	1	0.91	99.09
India	-	-	-	1	0.91	100.0
Total	128	100.0	100.0	110	100.0	100.0

Table 3: Distribution according to the major disciplines of the information profession

Subject	1996-2000		1991-1995	
	No.	%	No.	%
Librarianship	35	43.2	62	77.50
Archives	13	16.0	9	11.25
Information Science	29	35.8	8	10.00
Publishing	4	4.9	1	1.25
Total	81	100.0	80	100.0

Table 4: Distribution according to the major disciplines of the information profession

Type	1996-2000		1991-1995	
	No.	%	No.	%
Continental	15	18.50	21	26.50
Regional	5	6.20	1	1.25
National	53	65.40	48	60.00
Local	5	6.20	4	5.00
Organisation	3	3.70	6	7.50
Total	81	100.0	80	100.0

As with many bibliometric studies on LIS, journals constituted the single most popular format of publication cited by LIS researchers in both periods: 41.4% during 1991-1995 and 48.1% during 1996-2000 as revealed in table 5. Table 6 shows that most of the papers cited were published within 10 years of publication. Such papers accounted for 55.66% during 1991-1995, and substantially increased to 66.7% during 1996-2000.

Table 5: Distribution of papers according to the format of publication cited per year

Format	1996	1997	1998	1999	2000	1996-2000		1991-1995	
						No.	%	No.	%
Journal	71	64	75	126	74	410	48.1	385	41.44
Book	16	29	25	54	42	166	19.5	232	24.97
Conference proceedings	14	12	16	9	20	71	8.3	79	8.50
Technical report	8	29	11	14	18	80	9.4	129	13.89
Thesis	3	7	3	4	-	17	2.0	25	2.69
Others	1	36	5	27	40	109	12.8	79	8.50
Total	113	177	135	234	194	853	100.1	929	99.99

Table 6: Distribution of papers according to the time-span of citation per year

Years	1996	1997	1998	1999	2000	1996-2000			1991-1995		
						No.	%	Cumu	No.	%	Cumu
0-2	12	45	12	23	41	133	15.2	15.2	130	14.6	14.6
3-5	21	58	38	56	61	234	26.8	42.0	155	17.4	32.0
6-10	47	27	36	63	43	216	24.7	66.7	212	23.7	55.7
11-20	32	17	43	56	28	176	20.2	86.9	264	29.6	85.3
>20	15	19	19	41	20	114	13.1	100.0	132	14.8	100.1
Total	127	166	148	239	193	873	100.0	100.0	893	100.1	100.1

Eighteen of the journals cited during the 1991-1995 period contained five papers or more. During the 1996-2000 period, the number of journals containing five papers or more substantially increased to 27. The 27 journals constituted 61.7% of the total number of journal articles cited by the authors during the period 1996-2000. While the *African Journal of Library, Archives and Information Science* was ranked fourth during the 1991-1995 period, it was ranked as the most cited journal during the 1996-2000 period. *Nigerian Libraries* which was ranked first in the previous period was ranked 10th during the 1996-2000 period. The low ranking of *Nigerian Libraries* can be attributed to its irregularity in the last ten years. In the 1970s and 1980s it was published regularly three times a year. The *International Information and Library Review* did not change its ranking of third position in both periods. Only 10 journals appeared in both rankings. Majority of the publications cited during the period, according to table 8, were published in USA, UK and Nigeria. While USA and UK accounted for just about half of all the publications cited (50.32%) during 1991-1995, the proportion increased significantly during the period 1996-2000, as the two countries contributed 62.26%. This clearly shows that majority of the publications cited were published in the two countries and the increase was quite significant during the 1996-2000 period.

Table 7: Ranked list of journals with five or more citations

Title	Country	No.	1996-2000 ranking	1991-1995 ranking
African Journal of Library, Archives & Information Science	Nigeria	29	1	4
College and Research Libraries	USA	22	2	5
International Information & Library Review	UK	21	3	3
Libri	Denmark	12	4	7
Journal of Information Science	UK	11	5	9
Nigerian Library & Information Science Review	Nigeria	10	7	-
Journal of Library & Information Science	UK	9	8	-
Nigerian Libraries	Nigeria	9	8	1
South African Journal of Library and Information Science	South Africa	9	8	6
Aslib Proceedings	UK	8	12	-
Information Development	UK	8	12	10
Escarbica Journal*		8	12	-
Journal of Education for Library and Information Science	USA	8	12	-
Information Trends	Botswana	7	16	-
Serials Library Review	USA	7	16	-
American Libraries	USA	6	18	-
IFLA Journal	Netherlands	6	18	2
Journal of Academic Librarianship	USA	6	18	-
Journal of Documentation	UK	6	18	12
Journal of the American Society of Information Science	USA	6	18	-
Nigerbiblios	Nigeria	5	23	-
Wilson Library Bulletin	USA	5	23	-
Library Resources & Tech. Services	USA	5	23	-
Special Libraries	USA	5	23	-
Archavaria	USA	5	23	-

* Published in Southern Africa with no fixed country of publication.

Table 8: Distribution of journal citations according to the country of publication

Country	1996- 2000			1991-1995		
	No.	%	Cumulative	No.	%	Cumulative
USA	147	36.03	36.03	91	29.73	29.73
UK	107	26.23	62.26	63	20.59	50.32
Nigeria	72	17.65	79.91	62	20.26	70.58
South Africa	16	3.92	83.83	36	11.77	82.35
Denmark	12	2.94	86.77	11	3.60	85.95
Netherlands	12	2.94	89.71	18	5.88	91.83
Botswana	7	1.72	91.43	-	-	91.83
Australia	3	0.74	92.17	-	-	91.83
India	2	0.49	92.66	3	0.98	92.81
France	2	0.49	93.15	5	1.63	94.44
Canada	2	0.49	93.64	-	-	94.44
Zambia	-	-	93.64	6	1.96	96.40
Others	26	6.37	100.01	11	3.60	100.00
Total	408	100.1	100.01	306	100.00	100.00

Conclusion and Recommendations

These findings have clearly shown that the trend of LIS research in Africa in the last 10 years has not changed significantly. However, more papers on information science and archives were published during the 1996-2000 period than the previous period. Continental focused research papers diminished during the latter period. Most of the researchers used more up-to-date references during the second half of the decade. LIS researchers in Africa overwhelmingly cited journal papers published in the UK and USA. As a matter of fact, the trend is increasing. This is not surprising because only 6 out of the 27 ranked journals (Table 7) during the 1996- 2000 period were published in Africa. Also, there is increasing access to the Internet by LIS researchers, where journals published outside the continent are easily accessible, hence researchers were exposed to more literature. AJLAIS is the only LIS journal published in Africa that can be accessed on the Internet.

It is hoped that LIS researchers in Africa will focus more on continental issues than ever before. It is also hoped that colleagues across the continent will collaborate and focus on continental problems.

From the list of journals most cited by LIS researchers in Africa, LIS training institutions in Africa and those with concentration of African students elsewhere need to ensure that these journals form the core of LIS journals in their collection. Journals that appeared in both rankings should be given top priority. The finding that most of the journals cited were published outside the continent is an indication of the paucity of local journals. This clearly demonstrates the need for LIS associations and academic departments to resuscitate journals that are already moribund so that there could be more publications outlets for researchers in the continent. The fact that most of the researchers who published during both periods were trained in professional training institutions in Africa shows that these training institutions can be compared favourably with their counterparts elsewhere. There is therefore the need to ensure that the quality of the curriculum of the training institutions is maintained.

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* Iyabo Mabawonku is a senior lecturer in the Department of Library, Archival and Information Studies, University of Ibadan, Nigeria.

Library Literature in Ghana, 1950-1994

Jasiliu A. Kadiri

University Library

University For Development Studies

Tamale, Ghana

Email: Kadirija@yahoo.com

Abstract

Library literature in Ghana between 1950 and 1994, as listed in the two bibliographies compiled by Alemna (1994 and 1995), was analysed using bibliometrics as the method of research. The findings revealed that the number of published materials in librarianship in Ghana increased over time, with the upsurge noticeable in the last five years of the study, which recorded 26.30% of all the publications. It was revealed that journals, theses and books were the major formats of publication. Also, more research was published in foreign journals than local journals. The findings also show that the levels of literature scatter, as well as collaborative work, was low.

Introduction

The history of the Ghana Library Association (GLA), like its other Anglophone West African countries could be traced to the *UNESCO Seminar on the Development of Library Services*, which was held in Ibadan, Nigeria in 1953. Consequently, the West African Library Association (WALA) was formed in 1954. Country members of WALA comprised Gold Coast (now Ghana), Nigeria, The Gambia and Sierra Leone. Its official publication was the *WALA News*.

At the UNESCO seminar, the need to have a professional library association in individual countries was recognised, but this did not materialise until the early 1960s. In 1957 Ghana attained independence, and Nigeria and others followed in the 1960s. The need for national identity and the financial constraints involved in holding meetings led to the demise of WALA and it was dissolved in 1962. From the dissolution of WALA emerged the Ghana Library Association (GLA) and the Nigerian Library Association. In 1963, the GLA established the *Ghana Library Journal*. By 1986, GLA was recognised as a professional association, thus, becoming the first Library Association to be accorded such recognition in the sub-region (Alemna 1994). By 1994 it was noted that *Ghana Library Journal* had been out of

circulation for fifteen years (Alemna, 1994). Volumes 10 & 11 (combined) of the *Ghana Library Journal* were published in 1999.

The situation above leads to such questions as: are librarians in Ghana not researching and publishing? If they are, where are they publishing their research results and other relevant information? The answer to the last question can lead to further investigation as to what determines the choice of journal to publish in and where to publish by researchers of librarianship in Ghana.

In this paper, attempts will be made through the use of bibliometric method to identify formats of publications used for reporting librarianship in Ghana, and also the country of origin of journals used by librarians in reporting their research findings.

Methodology

Two bibliographies on library development and librarianship by Alemna entitled "A Bibliography of Library Development in Ghana, 1950 - 1990" (Chapter 12 of *Libraries & Information Provision in Ghana* (1994)) and "An Annotated Bibliography of Libraries and Librarianship in Ghana (1991 - 1994)" [Part two of *Librarians in Ghana: A Who Is Who and Annotated Bibliography* (1995)] were analysed. The two bibliographies covered the period of 1950 to 1994, that is, forty-five years. There were 327 entries in all. The entries were analysed by year and then cumulated by decade, formats of publications, and country of origin of journals used for reporting research. In addition, level of literature scatter, as well as the level of collaboration was examined.

Bibliometrics was used as the method of research for this study. "Bibliometrics" as a term was coined in 1969 by Pritchard to replace "Statistical bibliography". It is a type of applied mathematics used in library science, bibliography and documentation of academic knowledge, scientific documents and statistical work (Schmidmaier, 1983).

Bibliometrics involves the analysis of special bibliographies or citation analysis of specific subjects or disciplines. The importance of such analysis lies in the fact that it could assist in identifying features of a discipline, such as source of information, geographical "distribution of cited journals ... productivity of cited journals..." (Kumar 1984). When extensively used, it could assist in highlighting areas of a subject or discipline that have been extensively researched. When analysed chronologically, the outcome of the exercise can identify burning issues of a discipline periodically. Furthermore, bibliometric analysis is also a useful tool in

collection development as it assists collection developers in identifying nature and sources of information on a given subject (Hertubel and Buchanan, 1994).

Bibliometric studies have been extensively used in the analysis of librarianship literature in Africa. Afolabi (1976), Aina (1991) and Alemna (1996) used bibliometrics to analyse the literature of library and information studies.

Findings and Discussion

An analysis of the publications as shown in table 1 revealed that majority of the publications were published during 1980-1989 (88 publications), while the least number of publications was during 1950-1959 when there were 28 publications. There was only one publication in 1950. However, as shown in the table, the number increased progressively from one decade to the other and almost exploded in the last decade when 26.31% of all the publications was recorded in the first five years of the decade. This increase may be attributed to an increase in the number of professional librarians in Ghana or the interest now shown by the new generation of librarians in research work.

Table 1: Analysis of publications by decade

Decade	Number of Publications	Percentage
1950 - 1959	28	8.56
1960 - 1969	45	13.76
1970 - 1979	80	24.46
1980 - 1989	88	26.91
1990 - 1994	86	26.31
Total	327	100

Table 2: Format of publication

Format	Number Recorded	Percentage (%)
Journals	197	60.24
Theses	59	18.04
Books	39	11.92
Proceedings	30	9.18
Report	1	0.31
Occasional papers	1	0.31
Total	327	100

Table 2 identifies formats of materials on librarianship in Ghana. It shows that librarians in Ghana used six broad categories of formats. These were reports, books, conference proceedings, journals, occasional papers and theses. In all, 197 journal articles representing 60.24% were published. This shows that journals are good sources of information on librarianship in Ghana. This is consistent with other bibliometric studies that have been carried out on library and information studies literature. Theses came second with 59, i.e. 18.04%, while books including chapters in books constituted 11.92%. Report and occasional papers with 1 (0.31%) publication each were least used. Furthermore, it was revealed that 79.6% of the theses were submitted to universities outside the country, while only 20.4% were submitted to the Department of Library and Archival Studies, University of Ghana, Legon, the only library school in the country.

Since journals represented 60.24% of all entries analysed, journals were then ranked according to number of articles published. In all, 67 journals published the 197 journal articles recorded. In spite of the irregular nature of *Ghana Library Journal*, it recorded more articles than any other journal. Ghanaian librarians would seem to prefer to share their research findings with their colleagues in the country. However, it published 38 articles, which is merely 19.29% of all journal articles. Twenty journals with three or more articles were ranked. The 20 ranked journals published 141 articles, which represented 71.57% of the journal articles published. These journals obviously constitute the core journals of librarianship used in Ghana.

Ulrich's International Periodical Directory (1988) was used to identify the country of publication of the ranked journals. Table 4 shows that of the ranked journals: those published in Ghana recorded 53 articles (37.59%), while the remaining 88 (62.41 %) were published outside the country.

Table3: Ranked List of Journals

No	Rank	Journal title	No. of Articles	Cumulation	Country
1	1	Ghana Library Journal	38	38	Ghana
2	2	WALA News	10	48	Nigeria
3	3	Ghana Book World	9	57	Ghana
4	3	International Library Review	9	66	UK
5	5	Aslib Proceedings	8	74	UK
6	5	UNESCO Bulletin for Libraries	8	82	Paris
7	7	Libri	7	89	Denmark
8	7	Nigerian Libraries	7	96	Nigeria
9	9	Library Association Record	6	102	UK
10	10	African Research & Document	5	107	UK
11	10	Library World	5	112	Japan
12	12	Information Development	4	116	UK
13	12	Library Management	4	120	UK
14	14	African J. of Library, Archives and Information Science.	3	123	Nigeria
15	14	Education for Information	3	126	Nether- Lands
16	14	Education Library Journal	3	129	UK
17	14	Greenhill J. of Administration	3	132	Ghana
18	14	Journal of University of Science and Technology	3	135	Ghana
19	14	Library Journal	3	138	US
20	14	The Reference Librarian	3	141	US

Table 4: Place of publication of ranked Journals

Place of Publication	No. of Articles	Percentage (%)
Ghana	53	37.59
UK	40	28.37
Nigeria	20	14.18
France	8	5.67
Denmark	7	4.96
U.S.A	6	4.26
Japan	4	2.84
Netherlands	3	2.13
Total	141	100.00

The findings from the analysis also show that the level of literature scattering is low in the literature review of librarianship in Ghana. *Greenhill Journal of Administration* (Public Administration) and *Journal of University of Science and Technology* (Multidisciplinary) published three articles each; *Ghana Teachers' Journal* and *West African Journal of Education* recorded two each; while *LECLA Bulletin* (International Affairs) and *Ghana Trade Journal* published one article each. There were five other journals whose titles did not reveal their relationship to librarianship, there were six articles in this latter group. In all, 18 articles, which represents 12.76% of articles published could not be categorised or pinned down to publications that specialised on librarianship as a discipline. Also, the study shows that just as in literature scatter, the level of collaborative work or joint authors was low among writers on librarianship in Ghana. Of all the entries analysed, only seven works were produced by more than one author and this was just 2.14% overall. It was noticed that no work of three joint authors was listed.

Conclusion

The study of library literature in Ghana between 1950 – 1994 revealed the following characteristics:

- That information on the discipline in Ghana could be obtained through journals, proceedings, books and thesis;
- Reports were not very good sources of information on librarianship in Ghana;
- In all, more information was available in foreign sources. For instance, UK and Nigeria contributed over one-third of all the publications.
- Librarianship publication is increasing probably rapidly in Ghana especially if the last five years of study period is considered;
- Level of literature scatter is not high; and
- Joint-authorship or collaborative work is almost non-existent among library professionals in Ghana.

Perhaps the question to ask is why are more works being published outside Ghana to the detriment of *Ghana Library Journal*? This could be an interesting area for further research.

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- * Mr. Kadiri was, until recently, a senior assistant librarian at the University for Development Studies, Tamale Ghana. He is currently the College Librarian of Tai Solarin College of Education Library, Ijebu-Ode, Nigeria. He attended the Universities of Ilorin and Ibadan (both in Nigeria), where he obtained a B.A. and M.L.S. respectively.



JASILU A. KADIRI

Internet Access and Usage by Students of the University of Botswana

Ayoku A. Ojedokun
University of Botswana Library
Private Bag 00390
Gaborone, Botswana
Email: Ojedokun@mopipi.ub.bw

Abstract

This study focused on Internet access and usage by students of the University of Botswana. It investigated the adequacy of provision of access to, and the usage (in terms of use and misuse) of the Internet by the students, as well as the problems the students faced in its use. The study revealed that computers with Internet facilities at the time of this study were inadequate - hence many of the students did not have access. It revealed that although quite a number of the students were aware of the immense benefits of its use to academic studies, they lacked the necessary searching skills to make effective use of the Internet for this purpose. It also revealed that because of the lack of effective searching skills, those who had access used it essentially to search and retrieve information on entertainment, sports, and news from around the world. The study noted that the University has greatly influenced the students' use of the Internet to access information.

Introduction

The Internet has broken down barriers of communication and information access from anywhere in the world. It is fast, reliable and does not have restrictions on content or format. It also has a limitless range of facilities, which assist users to access the almost infinite information on the net. It offers the opportunity for access to up-to-date research reports and knowledge globally. It has thus become an important component of electronic services in academic institutions.

In terms of usage, studies reveal that the major use of the Internet is for surfing the World Wide Web (WWW) and e-mail. According to Windrum and Jong (2000), over one-third of individuals with Internet access use the WWW; and email is used by more than half of those with access.

In a report of the 1998 library survey of Internet users at Seton Hall University, 40.2% of respondents used the WWW on a daily basis, 38.3% weekly, and 10.7% on a monthly basis. About 10% respondents said they seldom or never used the Internet. It was equally found that students and faculty searched the Internet for information related to both their academic (83.2%) and non-academic studies (73.8%) (Bao, 1998).

There is no doubt that the advent of broad-band digital networks, the growth of distance learning both within nations and across international borders and the rapid application of information and communications technology (ICT) in educational institutions are now challenging institutions to adapt policies to new circumstances to achieve set goals. It was in the light of these that the University of Botswana decided to provide access to the Internet through faculty and departmental computer laboratories as well as the University Library.

The University of Botswana (UB) was established on the 1st of July 1982 by an Act of Parliament but was formally inaugurated on the 23rd of October 1982. Like other similar institutions, it has the responsibility of improving the quality and expanding the quantity of human resources needed for the development of the Republic of Botswana (UB Calendar, 1999/2000). One way of accomplishing this goal is by providing access to up-to-date research and knowledge globally.

The objective of this study therefore was to determine the adequacy of provision of access to, and the usage (in terms of use and misuse) of the Internet by the students. It sought also to identify the problems the students faced in its use. The study adopted a social survey design.

Methodology

The full-time student population for the study year was 8138 (UB enrolment statistics 1999/2000). A total of 1500 respondents were selected. This constituted 18.43% of the population. The random sampling technique was used to select

respondents across the university in general. This is because students generally attend classes across more than one faculty. The data collection instrument used for this study was the questionnaire. The questionnaire was structured to clearly identify the important variables to be measured. This included access to the Internet, usage in terms of use and misuse of the Internet, and problems students encountered in the use of the Internet. It was further designed to elicit some personal information and other views relevant to the study. Copies of the questionnaire were distributed and collected with the assistance of the teaching staff across faculties. The return rate was 1480 representing 98.67%. A majority of the sample (1450) were undergraduates who constituted 98% of respondents. Postgraduate respondents were 20 (1.4%) while 10 (0.7%) respondents did not indicate what degree they were enrolled in. Of the total respondents, 760 (51.4%) were female while 720 (48.6%) were male. One thousand two hundred and eighty (86.5%) of the total respondents were from Botswana. One hundred and seventy respondents were from outside Botswana. Thirty (2%) of the total respondents however did not indicate their country of birth.

Results and Discussion of Data

Access to the Internet

The study showed that 340 (23%) of the respondents were not using the Internet, as they indicated 'not applicable' to all eight questions on 'access to the Internet'. The study also showed that the students used a variety of sources to access the Internet as revealed in table 1. As expected most of the students accessed the Internet through computer laboratories, which are accessible to all the students for most of the day. One finding of the study, which showed that students tend to use the faculty computer laboratories more than the University Library, could either mean that the students felt comfortable using the faculty as a point of access because of less distraction/harassment from staff and fellow students, or that the computer facilities provided by the University Library were inadequate. Indeed, there were more computers with Internet facilities in the faculty computer laboratories than in the Library. Students hardly use the computers in the Library even when searching for reference sources.

Table 1: Point of Access

Point of Access	Number of respondents	%
Faculty Computer Laboratory	590	39.9
University of Botswana Library	340	23.0
Home	60	4.1
Lecturers' Offices	10	0.7
Others	140	9.5
Category not using Internet	340	23.0

Table 2: Experience of Internet Search

Duration of Access	No. of Respondents	%
Less than 6 months	460	31.1
7 - 12 months	190	12.8
13 - 18 months	180	12.2
19 - 24 months	90	6.1
Over 24 months	200	13.5
No Response.	20	1.35

Table 3: Duration of Internet Search

Duration of Access	No. of Respondents	Percentage
Less than 1 Hour	480	32.4
1-3 Hours	410	27.7
4-6 Hours	70	4.7
7-9 Hours	80	5.4
Over 10 Hours	70	4.7
No Response	30	2.0

The study also found that a large number of the students had been using it for less than six months (31.1%) as shown in table 2. Table 3 shows that 60.1% of the sampled students spent three hours or less per week surfing the Internet, while only 4.73% of the students spent more than 10 hours per week. This could be attributed to the fact that a significant number of the students used the Library as access point

to the Internet where there is time limitation. The one hour time allocation by the Library was as a result of the limited number of computers with Internet facilities. The study sought to know the facilities mostly used on the Internet. It did this by making a few suggestions. The students were asked to rate the regularity of use on a scale of 1 to 5 (1 = very frequently, 2 = frequently, 3 = rarely, 4 = very rarely, 5 = never), and then the final average was the sum of all the ratings multiplied by the number of respondents for each rating, and divided by the total number of respondents. The lower the average obtained, the higher the frequency of use since frequently was ranked 1st and never 5th. It was therefore found that *electronic mail facilities* were mostly used on the Internet with an average rank of 2.26. This was followed by *Web browsing* and *Newsgroup*. The *Chat facilities* and *Discussion groups* found less use by the students (see Table 4).

Table 4: Use of Internet facilities

Facilities	E-mail	Web browsing	Newsgroup	Chat facilities	Discussion Groups
Average Rank	2.26	2.74	3.36	4.03	4.04

It was of interest to find out how students who used the Internet came to learn its use. Five possible learning sources were suggested. They were then asked to rank them in the order in which the effective use was imparted, from the minimum rank of 1 to a maximum of 6. Not all variables were however ranked by the respondents. The sum of ranks was calculated and divided by the number of respondents for each variable to obtain the average rank (See Table 5 below). It was found from the average ranks that the students acquired skills in descending order of importance: *teaching by friends* (1.47), *self-teaching* (1.87), *library orientation* (2.9), *reading of books* (3.04), *information literacy skills (ILS) programme of the library* (3.39).

Table 5: Mode of imparting skill

Mode of Imparting Skill	Teaching by Friends	Self-Teaching	Library Orientation	Reading of Books	ILS Programme of the Library
Average Rank	1.47	1.87	2.9	3.04	3.39
No. of Students	810	520	350	240	310

Ironically, library orientation of 30 minutes duration per group of 15 students came third ahead of the ILS. However, what became obvious from the study is the need for the Library to restructure its ILS programme and give serious attention to the Internet searching skills of patrons. It must be appreciated that the Internet has become an important source of information for academic studies. This was indeed revealed in a survey conducted by Bao (1998) where 78.5% of the students and faculty respondents used it for their academic studies on a daily or weekly basis.

Usage of the Internet

The study sought to find out how Internet facilities such as the electronic mail and the World Wide Web (WWW) were being put to use. Four potentialities were suggested (communication with lecturers, communication with friends and relatives in and outside Botswana, communication with students in and outside Botswana, and participation in discussion groups). Respondents were also given the option of indicating non-use of e-mail and also to specify other uses. Of the options, 560 (37.8%) respondents rated e-mail communication with friends and relatives as their first major use, and only 7.4% of the respondents used the Internet to communicate with lecturers (Table 6).

Table 6: Use of Electronic Mail

Use	Number of respondents	Percentage
Communication with friends and relatives	560	37.8
Communication with students	200	13.5
Communication with lecturers	110	7.4
Participation in discussion groups	70	4.7
Other use	70	4.7
Non-use of e-mail	250	16.9
No response	220	14.9

On the other hand, of the six potential uses of the World Wide Web (WWW), three hundred and ten (20.9%) respondents rated access to entertainment and sports as their first major use of the WWW, while 290 (19.6%) respondents rated access to news items as the second major use (see Table 7 below). As many as 230 (15.5%) of the students did not use the WWW.

Table 7: Use of WWW

Use	Number of respondents	Percentage
Entertainment and sports	310	20.9
News	290	19.6
Academic materials	230	15.5
General browsing	90	6.1
E-mail web server	70	4.7
Other university sites	20	1.4
Other use	30	2.0
Non-use of WWW	230	15.5
No response	210	14.2

These findings revealed that the majority of the respondents were not using WWW for academic matters. One would have expected that the Internet would be used as a means of communication between the teacher and learner, and between different groups of learners, as well as a means of accessing academic related information. Indeed, only 230 of the respondents (see Table 7) using the Internet had ever retrieved academic related materials from the Web. When respondents were further asked to indicate, as many as applicable, the type of data they had ever downloaded from the Internet, respondents indicated such files as images of superstars - 370 (25%), computer games - 250 (16.9%), audio files - 100 (6.8%) and pornographic related materials - 100 (6.8%), music files - 250 (16.9%), computer software - 220 (14.9%), newspaper articles - 310 (20.9%), and full text of academic related materials - 400 (27%), among others. What is disturbing was the use of the Web to search for, and retrieve pornographic materials - an obvious misuse of the Web in an academic environment. Sloane

(1997) acknowledged that the WWW holds more useful, up-to-date and relevant (to many subjects) information than most university libraries and that there are a wealth of WWW pages that are relevant to quite a number of subjects. One would then have thought the students would have been more interested in those sites that support the learning process. The challenge this poses therefore is that these students must be made aware of, and encouraged to use the diverse set of resources essential to their studies and available on the WWW.

Table 8: Favourite search engines

Search engine	Number of respondents	%
Yahoo	370	25.0
Excite	80	5.4
Alta Vista	60	4.1
Info seek	50	3.4
Lycos	50	3.4
HotBot	40	2.7
Webcrawler	30	2.0
Whowhere	20	1.4
No favourite engine	460	31.1
No response	290	19.6

The students were also asked to indicate their favourite Internet search/navigation engine. Table 8 shows that the students used a variety of Internet search/navigation engines. Yahoo seemed to be the favourite tool. Three hundred and seventy students (25%) indicated Yahoo as their favourite search engine.

The students were also asked to rank the single major problem/constraint in their use of Internet facilities on campus. Four identifiable problems/constraints were given. These are: very few computers with Internet facilities, very slow Internet connection, very little time allocation for Internet use, and very little training in the use of the Internet facilities. They were also given the option of identifying other problems/constraints. The sum ranks of the responses were calculated and divided by the number of respondents for each variable to obtain the rank average. *Provision of very few computers with Internet facilities* had an average rank of 1.46. This was followed by *inadequate training in the use of the Internet*

facilities offered to students with an average rank of 1.85, and then closely followed by the very slow Internet connection (2.18). The respondents indicated that oftentimes it took too long to load Web pages. Last from the rank average is the time allocated for Internet use by the University Library (2.47)).

The major problems from the above results are the inadequate provision of computers with Internet facilities and training in effective use. Information literacy is no longer simply knowing how to read and write, but now includes the knowledge and skills relating to locating, processing, exchanging, and effectively using information regardless of delivery mechanisms and the type of format in which that information appears. Today's students require these skills, especially those that are necessary to access and retrieve information relevant to their studies from the global electronic environment. They will not only have to exercise such skills now, but will continue to do so even in their future careers. Unless these problems are addressed, they are capable of making the students information illiterate; the consequence of which has implications for the quality of the country's human resources.

Suggestions and Comments from Respondents

The study sought suggestions from respondents on how best the problems encountered could be resolved. A comment from some of the respondents was that very few students showed interest in using the Internet at the University of Botswana. This could be as a result of problems encountered, which many regarded as intractable. A particularly interesting comment from one of the students is reproduced below:

It is high time that students in UB were taught about interacting with computers. Theory on IT should be allocated less time. One learns more by doing rather than by reading the concepts of other philosophers. Students should be taught how to create Web sites. Library students particularly should be taught how to create electronic catalogues, bulletin boards and do desktop publishing rather than reading them in books only. We want to experience the global village in reality, not in vision.

This comment is a challenge to the teachers. This study also revealed that many of the students were aware of the benefits of the Internet. They however did not have the skills to make maximum use of these benefits but were willing to learn.

From the various suggestions that were made by the respondents, two issues clearly emerged. These are the provision of more computers with Internet facilities in the faculties and the University Library, so as to have more access, as well as the provision of training on the use of the Internet.

Conclusion and Recommendations

It is quite obvious from the study that computers with Internet facilities for the use of students at the University of Botswana at the time of this study were inadequate; hence not many students had access to the Internet. What has also become clear is that the students lacked the necessary skills for effective Internet search. Adequate training on effective Internet search seems not to have been provided to the students as at the time of the study. Therefore, as the only university in the country responsible for the development of human resources, it is recommended that:

- The University establishes computer laboratories in all teaching departments without exception.
- The University Library restructures its information literacy programme to accommodate training on effective Internet search skills.

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*Mr. Ayoku A. Ojedokun is a librarian at the University of Botswana Library. He attended the University of Ibadan, Nigeria. He holds a B.Sc. in Chemistry and a Master of Information Science (M. Inf. Sc.) degree.



A. OJEDOKUN

Adoption and Growth of Information Technology in Nigerian Architectural Firms

Olajumoke Fasheun-Motesho

Epgraph Consult

42 Kenneth Dike Way

Bodija, Ibadan, Nigeria

Email: epgraph@infoweb.abs.net

Abstract

Nigerian architectural practices are mainly small-scale enterprises with only a small percentage of them using IT for core architectural functions. This is partly due to the many problems that inhibit IT transfer to small organisations in developing countries. Using social survey methodology, the study examined the factors that have influenced IT adoption and use for core functions by architectural firms in Nigeria's two largest cities, Lagos and Ibadan. Many of the factors that had encouraged IT growth for the firms were similar to the typical adoption factors that had motivated them to acquire IT initially. High costs of IT constitute the main constraint to IT growth in the firms.

Introduction

Previous studies have highlighted the strategic disadvantages that nations and industrial sectors would face if they do not position themselves to harness and use information technology (IT) as a tool for leveraging their activities in the emerging global economy. The continuing turbulence of the business environment, the changing nature of work, opportunities afforded by electronic integration, and the changing competitive climate have all combined to present organisations with compelling reasons to rethink their structure, roles and missions, and the manner in which they go about their businesses (Galliers, 1992). Some Nigerian architectural firms have started to do this by adopting IT for use in all areas of their business. Like most other businesses, architectural practice is no longer location-bound; international boundaries are being broken leading to an increase in collaborative architectural practice worldwide. IT has gradually become a necessity for architectural practices that want to broaden their competitiveness and influence within the building industry and the global economy.

Computer use in large organisations has been carefully studied and several models of growth proposed. However, comparatively very little is known about the adoption and

growth of computing in small firms, although more of them are installing and upgrading computers. Even much less research has been done with particular reference to architectural firms, particularly in developing nations including Nigeria. The problems encountered by smaller firms are likely to be different from those encountered by large firms, and require different managerial approaches.

Almost all architectural firms in Nigeria fall within the small and medium enterprises (SME) category having less than 100 employees. In view of the growing importance of IT as a basis for productivity and competitiveness of architectural businesses, there is a growing need to understand the factors that have influenced the adoption and growth of IT in Nigerian architectural firms. Hence, this study sought to investigate IT adoption and growth pattern among Nigerian architectural practices that are already using IT for core architectural functions/activities as the basis of guidelines to others that have not done so yet. Accordingly, the following specific objectives were set for the study:

- (a) identifying the range of IT utilised in Nigerian architectural firms;
- (b) identifying factors that have contributed to or limited IT adoption and growth in the firms;
- (c) predicting/recommending increased use of IT employed by Nigerian architectural firms.

IT adoption is the process during which a firm begins to use IT to facilitate its routine operations and tasks. However, the real challenge is often not IT adoption *per se*, but a firm's ability to take advantage of IT functionality (McKenny, 1995). Reaping the full benefits of IT adoption requires not only a full understanding of IT applications and their potential but also a readiness to change because the competitive advantage of IT is contingent on not just acquisition, but also on the assimilation of IT products and applications into organisational processes (Abdulla & Kozar, 1995). Hence, in the present study, IT adoption by a firm was taken to imply not just the mere possession of computers, but the firm's use of IT for its core functions and activities which, in the context of architecture business, implies the use of IT for the performance of design tasks, project supervision and administrative functions.

Lefebvre & Lefebvre (1996) classified IT adoption factors into those originating from inside or outside the organisation. Internal factors are conditions that are internal to the firm, and can be grouped into three main categories: firm's past experience with technology, firm's characteristics, and firm's strategy. External factors are conditions that exist in a firm's external environment, and pertaining to the firm's industry, macro-economic environment, and national policies.

Cragg and King (1993) claim that internal factors are generic to all firms, whilst external factors (especially the ones pertaining to the macro-economic environment and to national policies) are country specific. However, since the factors have generally been identified through studies of large organisations, their applicability to small businesses cannot be assumed because small organisations have been shown to have slightly different technology adoption patterns from large ones.

An intrinsic aspect of the character of an information economy is what economists often describe as the 'network effect' (Omoigui, 1998). This refers to the phenomenon wherein the value of a network rises non-linearly as more subscribers (components) are added to it. The same opportunities exist for individual firms. Although IT adoption and integration can be undertaken at the same time, IT integration is a more involving process during which a firm alters its business practices and applications so that its IT can interface efficiently with each other.

Mere networking of a firm's IT does not mean that a firm's IT is fully integrated. However, networking is a key aspect of IT integration, which often depends on the networking of IT hardware, software and data resource components. In order to have a successful IT integration, a firm needs, for example, an IT-literate user population, access to wide ranging IT skills and a flexible structure able to change to suit dynamic requirements. These capabilities require time to develop and it is often safer to develop them before integrating IT to effect major changes to a firm's operations as these are the very qualities that become significant at the integration stage. Full integration often requires inter-organisational design and policies that are essential to achieve the performance improvements and full beneficial impact of IT. Thus, the mastery of integration is the key to the sophisticated use of IT.

Iacovou et al (1995) have predicted that the level of IT integration is positively related to the benefits an adopter can receive from IT capability. In architectural firms, for instance, design processes and working procedures must be well defined and organised with good communication between members of a project team and within the firm as a whole. Hence, IT applications and computer databases must be well organised and networked. Real integration often brings about real efficiency and can help alter the practice of architecture dramatically.

As more firms successfully adopt and implement IT applications, the comparative competitive advantages derived from the adoption of these applications may very well disappear if firms do not stay ahead and grow with IT use. For a firm that is lagging behind, IT adoption could become a question of survival. Much of the previous studies

on management information system (MIS) growth and success in small firms have attempted to confirm findings from studies set in large firms.

Research Methodology

This paper is based on a subset of the data in respect of a study of the adoption, growth and impact of IT in architectural firms in two large Nigerian cities (Obayemi, 1999). Although multiple firms were surveyed, firm-level variables were emphasised. The choice of the firm as the unit of analysis was justified on the basis that a complex organisational phenomenon, such as the adoption of IT, could be better understood if the contexts of the action were also studied (Cragg & King, 1993). There were 195 firms, or 58% of all registered architectural practices in Nigeria were in the two cities. The survey was restricted to these two cities for logistical expediency necessitated by the need to meet the prospective respondents in person and elicit their cooperation in completing and returning the questionnaire. The surveyed firms were all registered with the Architects Registration Council of Nigeria (ARCON). The firms also use IT extensively in performing core architectural and office functions. To ensure that firms have had an opportunity for growth in the use of IT, only firms that had been using computers actively in core architectural functions for at least two years were selected.

ARCON's *Register of Firms Entitled to Practice in Nigeria* (1997) was used as a preliminary instrument to find out which firms in both cities were using IT for core architectural functions. A total of 27 firms qualified in Lagos and seven in Ibadan. Since the growth of IT in these firms was one of the things the study intended to explore, the number of years that firms had been actively utilising IT was used as the criterion at the second stage of the selection process to select the number of firms eventually used for the study. Hence, a total of twenty firms were finally selected for investigation: 15 in Lagos and five in Ibadan.

The questionnaire method was adopted as the sole data collection instrument and one questionnaire was administered per firm to the 20 firms used in this study. This questionnaire collected information on both firms' background and variables pertaining to the adoption, growth and impact of IT in each firm over time. In all, a total of 20 copies were distributed and all 20 were returned, with all also being usable. The 100% rate of questionnaire return was achieved through personal distribution of questionnaires and repeated prompting of respondents by the author.

Findings

Characteristics of the Firms

The sampled firms all performed normal architectural services (architectural design and construction supervision), in addition to project management, site preparation and development, renovation/revitalisation of old projects, and feasibility studies. Fifteen (75%) of the firms were more than 10 years old. There was about an equal number of firms with less than 10, 10-20, and 21-50 employees respectively. None of the firms had more than 50 employees. Most of the firms (65%) were owned by 2-3 partners. Apart from the partners, the number of other architects employed by these firms ranged from none to fifteen. Of the 18 firms employing other architects apart from the partners, 12 had all their architectural staff skilled in computer use. Four other firms had more than 50% of their architects skilled in computer use. Only two firms had less than 50% of their architects with computer use skills. Partners in 16 of the firms used IT themselves, whilst all the architects in 15 (75%) of the firms were IT users. As for administrative staff, 9 firms claimed that all administrative staff were users of IT whilst 7 firms noted that only some of their administrative staff used IT.

IT Adoption and Usefulness

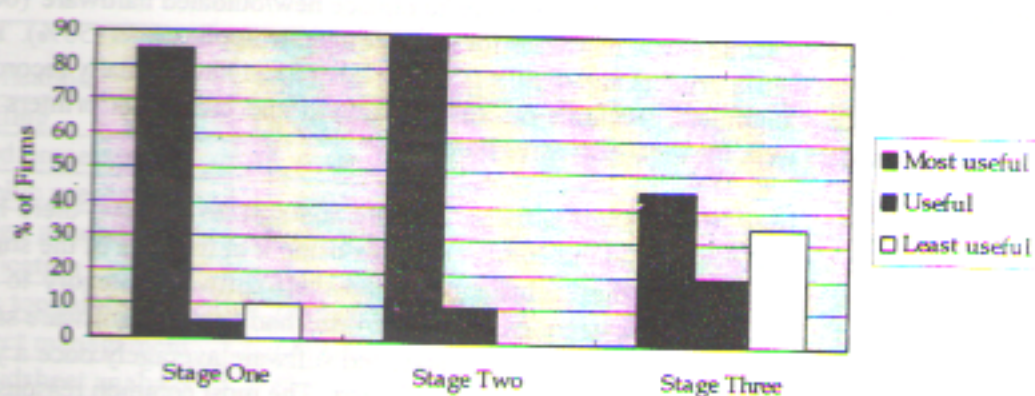
Prior to the 1990s, only two of the surveyed firms had adopted IT for use in 1982 and 1990 respectively. The factors that influenced IT adoption by the firms are shown in Table 1 below. Five internal factors were rated by all firms as having had a significant influence on IT adoption, whilst another set of nine factors were rated as such by over 80% of the firms. Of the two external adoption factors investigated, only one - competitive pressure - had a significant influence on IT adoption. The other external factor - imposition by clients/co-consultants - was considered by the majority of firms as having no influence whatsoever on IT adoption. It would appear thus that firm and industry related factors, rather than client preferences, influenced the firms, suggesting that IT might have been adopted by the firms to speed up their internal work processes, but not really to meet the high standards of specific clients.

Table 1: IT Adoption Factors

Adoption factors	Significant influence (%)	Little influence (%)
Increased ability to provide better service (I)	20 (100%)	-
Enhanced firm image (I)	20 (100%)	-
Competitive pressure (E)	20 (100%)	-
Higher work quality (I)	20 (100%)	-
Increased ability to compete with peers (I)	20 (100%)	-
Faster processing & exchange of information (I)	20 (100%)	-
Increased timeliness (I)	18 (90%)	1 (5%)
Better information management (I)	17 (85%)	1 (5%)
Increased information sharing ability with co-consultants (I)	17 (85%)	1 (5%)
Improved internal operation (I)	17 (85%)	2 (10%)
Increased accuracy (I)	17 (85%)	3 (15%)
Increased accessibility to information (I)	17 (85%)	3 (15%)
Increased ability to reach new clients (I)	16 (80%)	2 (10%)
Labour savings (I)	16 (80%)	3 (15%)
Managerial enthusiasm (I)	15 (75%)	1 (5%)
Reduced transaction costs (I)	12 (60%)	6 (30%)
IT consultant/specialist support (I)	10 (50%)	6 (30%)
Imposition by clients/co-consultants (E)	7 (35%)	7 (35%)

N = 20 firms

Key: I - Internal factor; E - External factor.

Figure 1: Usefulness of IT firms in normal architectural practice

Key: Stage One - preliminary & final design; Stage Two - production drawings & details; Stage Three - obtaining tenders to completion.

Information Technology was considered by the firms as being most useful at the second stage (production of drawings & details) of the normal architectural service, followed closely by stage one (preliminary & final design) and was considered least useful for obtaining tenders to completion stage (see Figure 1). Moreover, there was a substantial disparity in IT usefulness between networked and non-networked firms in stage three of the normal architectural services (i.e., obtaining tenders to completion stage). IT was most useful for this stage to only 11.1% of the non-networked firms in contrast to the 72.7% of the networked firms. This implies that integration might somewhat affect the use of IT for obtaining tenders to completion stage.

IT Growth

A computer network is a systematic organisation of separate and autonomous computers or processors interconnected to achieve some goals more than any of the units can singly achieve. Only 11 of the firms surveyed had their IT networked. Of these eleven firms, 5 (45.5%) started their respective networks within the first two years of IT use; 4 firms (36.4%) started after 2-5 years of IT adoption whilst the remaining 2 firms started theirs more than 5 years after initial IT adoption. The most popular reason for the networking of systems was in order to 'enhance ability to share data/information between systems,' 'Easier/greater work coordination' and 'enhanced communication between work terminals'

were the next most popular reasons, whilst 'cost effectiveness' was the least common reason. Whether networked or not, all of the firms had acquired new hardware since their

initial acquisition. For 14 (70%) of the firms this was in order to 'allow the extension of their range of applications.' Other reasons were 'to replace new/outdated hardware' (60% of the firms) and 'to acquire new hardware for supporting new applications' (50%). The acquisition of dot matrix printers and digitisers on the other hand have actually recorded negative growth. Computers, facsimile machines, modems and bubble jet printers (in descending order) were the most pervasive hardware.

While most firms used off the shelf software initially and still do so now, there has, however, been a slight decrease in the number of firms using it at the time of the study. Two firms had migrated from the exclusively off-the-shelf software category to the customised and hybrid software categories. All of the firms had acquired software since initial IT acquisition. Most of the firms (75%) acquired software averagely once a year whilst another 20% acquired new software once in 2 years. The most common reasons for new software acquisition were to upgrade old/outdated software (90%), and facilitate support of new applications (65%).

The greatest growth in IT applications had come in the area of electronic mail and Internet browsing. Other significant growth areas were project management applications, financial management applications and applications for personnel records. Data analysis, design verification/generation, graphic presentation and database management applications had also experienced some growth. The least growth area was drafting applications. IT use had diffused into the various functional areas of the firms such as office administration (word processing, personnel records); financial management; architectural services (design generation/verification, drafting) and office communication (e-mail, Internet browsing).

The factors that encouraged IT growth comprised internal, external, and personality factors. Most of the firms (55%) set out to use IT to gain competitive advantage. To them, IT is an enabling technology that could further make the firms more flexible and profitable. While 41.2% of the firms were strongly influenced by the consultant support factor in their IT growth, partners/managers in 47.1% of the firms who were very enthusiastic towards IT had significantly influenced its growth.

Table 2: Growth in Use of IT Applications

Application	Initial IT application	Present IT application
Drafting	16 (80%)	20 (100%)
Word processing	13 (65%)	16 (80%)
Graphic presentation	10 (50%)	14 (70%)
Design generation/ verification	10 (50%)	14 (70%)
Desk top publishing	9 (45%)	11 (55%)
Project management	5 (25%)	12 (60%)
Spreadsheet analysis	7 (35%)	10 (50%)
Personnel records	7 (35%)	12 (60%)
Database management	3 (15%)	7 (35%)
Financial management	5 (25%)	11 (55%)
Electronic mail	3 (15%)	15 (75%)
Internet browsing	2 (10%)	14 (70%)
Data analysis	2 (10%)	6 (30%)

N = 20 firms

Table 3: Factors that significantly influenced

Factor	% of networked firms influenced by factor	% of non-networked firms influenced by factor
Increased timeliness (W-RA)	72.7	100
Increased accessibility to information (IP-RA)	72.7	100
Improved internal operation (PC-RA)	72.7	100
Increased ability to provide better service (W-RA)	72.7	100
Enhanced firm image (F-RA)	72.7	100
Faster processing & exchange of information (IP-RA)	72.7	88.9
Increased information sharing ability with co-consultants (IP-RA)	72.7	55.6
Increased accuracy (W-RA)	72.7	88.9
Better information management (IP-RA)	72.7	88.9
Increased ability to reach new clients (F-RA)	72.7	88.9
Improved planning and control (PC-RA)	72.7	77.8
Increased ability to compete with peers (F-RA)	72.7	100
Competitive pressure (OF)	63.6	77.8
Labour savings (E-RA)	63.6	66.7
Higher work quality (W-RA)	63.6	100
Managerial enthusiasm (OF)	63.6	55.6
Reduced transaction costs (E-RA)	45.4	44.4
Imposition by clients/co-consultants (OF)	36.4	44.4
IT consultant/specialist support (OF)	36.4	22.2

KEY: IP-RA - Information Processing Relative Advantage; PC-RA - Planning and Control Relative Advantage; W-RA - Work Relative Advantage; E-RA - Economic Relative Advantage; F-RA - Firm Relative Advantage; OF - Other Factors

The relative importance of various IT growth factors varied among the firms. Ten of the 19 factors in table 3 had significantly influenced IT growth in between only 30%–45% of the firms. Most of the factors that encouraged IT growth could be said to be factors that had to do with the firm's internal workings. Competitive pressure appeared to be the only external factor that encouraged IT growth significantly. Although firms are subject to various external pressures to adopt IT, the relative importance of such external factors can vary not only from sector to sector but also sometimes from country to country (Lefebvre & Lefebvre, 1996). Hence, although Iacovou et al. (1995) had predicted 'the imposition of IT adoption by clients/co-consultants' to be a critical IT adoption factor for SMEs, only 38.9% of the firms in this study considered that factor as having had any significant influence on their IT adoption and growth decisions. The firms acknowledged economic factors to be the major factors limiting IT growth. IT was not growing in some firms (65%) because of the economic recession in Nigeria ('inappropriate economic climate'), whilst in other firms (50%) the constraint was the high cost that the updating of IT requires.

While many firms have experienced growth in the number and type of IT applications, there had been little change with respect to the management of IT in small firms. The original computerisation champions still remain the champions today. A correlation of the influencers of IT adoption will indicate that the same group of people are responsible for the firms' IT, despite the growth in applications. At the adoption initiation process, partners were responsible in 14 of the firms for initiating the idea and were involved in the actual decision to adopt in 17 firms. Partners were also involved in IT development decisions in 17 firms and were into managing the IT of 12 firms.

IT adoption generally came late in the architectural firms as only two of the surveyed firms adopted IT prior to the 1990s. The number of registered firms that have adopted IT for use in core architectural functions from 1990 till date in the two cities used in this study was still very low. Igwe (1998) conceded that a large majority of Nigerian architects were still doing design work manually. Nevertheless, the results of our survey show that a substantial percentage of the very few firms that had acquired IT used them primarily for drafting purposes.

The fact that IT was rated by the firms as being most useful at stage two (production and details) of the normal architectural services at the firm (100%) level comes as no surprise as this is the stage where the bulk of drafting work is done. Also revealing is that IT was also found useful by almost all firms at stage one (preliminary and final design). This implies that firms have moved beyond just using IT only for drafting to using it extensively for design generation/verification. The use of IT at stage three (obtaining tenders to completion) has also improved as 65% of firms found IT useful at this stage possibly because of the increasingly popular role of the architect in project management.

The greatest growth in IT applications had come in the area of electronic mail and Internet browsing, indicating that Nigerian architects are taking advantage of international boundaries that are being broken by the electronic media by equipping themselves to compete in the global market (Aina, 1998).

Owner-managers play a highly dominant role in small business strategy, decision-making and organisational climate as they are often the only ones in the enterprise with the authority, responsibility and access to the information needed to identify opportunities for using IT for strategic or competitive purposes (Billy & Raymond, 1992). In a few instances (30% of the surveyed firms) it was found that IT adoption and growth decisions were driven from the bottom by employees, while the partners were followers rather than initiators. Since practising professionals, rather than IT specialists, led the move to adopt and implement IT, it brought about their early commitment to mastering IT use, thus enhancing and empowering their professional role, rather than subordinating or replacing it. Though all the firms had experienced considerable growth, they had also all experienced limitations to further growth. This study agrees with empirical findings that suggest that economic costs is one of the most important factors that hinder IT growth in small organisations (Cragg & King, 1993). This is because SMEs tend to lack the resources that are necessary for IT investments (Iacovou et al., 1993; Billy & Raymond, 1992).

Conclusion

The information age, like the industrial age before it, has and will continue to undoubtedly have a colossal impact on the efficiency and mechanics of civilisation. Thus we find the world today deeply enmeshed with IT almost everywhere in business, public administration and daily life. Hence, IT adoption and growth must be understood, directed and managed not just as electronics, software or even as discrete information handling activities but as part of the very texture of the lives that we live (Avgerou & Cornford, 1993).

This study has provided several insights into the dynamics of IT's impact on architectural firms in Ibadan and Lagos. Some of these are: IT adoption is still very low amongst architectural firms in the two cities surveyed, IT use has diffused into all stages of the normal architectural services process and for other core functions performed by these architectural firms. Whilst growth has occurred, many of the factors that had encouraged IT growth for the firms in this research were similar to the typical adoption factors that had motivated them to acquire IT initially.

Nigerian architects are today daily contending with issues such as the oscillation of the business world, the nation's changing fortunes and its political instability. In the

developed world, IT has replaced drafting tools and has become the principal tool at the designers' workstation. In Nigeria, however, it is just beginning to gain ground as standard office equipment for word processing, accounting functions and desktop publishing. The bulk of the design and drafting work in a majority of architectural firms are still done manually. Apart from this, there is also the struggle of the Nigerian architect to retain his position and influence within the building industry which is being keenly contested for by other building industry consultants. The questions then would be, what does architecture in Nigeria need to survive for the future and what will the future be for it?

Firstly, the profession will have to position itself for the challenges of the future as there is bound to be a deeper incursion of IT into the building industry as well as continuous challenge to the professional influence of the architect. In order to maintain their leadership position in the building industry and to constantly ensure a vantage position and role, architects will have to learn to substitute breadth for depth (Aina, 1998). IT can be exploited for the reassertion of their influence through enhancement of the full expression of the diverse opportunities their professional training gives them within the industry.

For architecture to survive, IT will have to be utilised as a tool for the processing and communication of information about buildings. Aina (1998) notes that a well developed virtual building is the basis for extended client services, and a greater market share in the building industry. It ensures the architect's simultaneous development and management of all the information about a building throughout its lifetime instead of the traditional assembly line approach. By allowing architectural practices to operate more like servers of building databases with limited access to clients, consultants and contractors and consequently ensure a stronger role for the architect as creator. Having unlimited access to information and unconstrained by the traditional boundaries of space and convenience, the operations of Nigerian architects would be much more efficient, thus, ensuring the ability to compete globally through virtual channels while remaining physically resident in the country. All of these cannot be done without the use of IT. Architects who resist change may suffer from the consequences of change as change itself is fundamental to the very existence of professionals. Recent trends due to IT advancements indicate that Nigerian architectural firms cannot afford to lag behind their foreign counterparts in the race for the acquisition of IT skills and knowledge. Manual design and drafting methods have become obsolete and sentimental attachment to the T-square is retrogressive. IT use is, without doubt, the future for architecture and allied disciplines in the building industry.

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*Olajumoke Fasheun-Motesho is Associate Partner at EPGraph Consult, an architectural consultancy firm at Ibadan, Nigeria. She is a holder of both the B.Sc and M.Sc. degrees in architecture and the Master of Information Science degree of the Africa Regional Centre for Information Science, University of Ibadan, Nigeria. She is a member of both the Nigerian Institute of Architects and the Architects Registration Council of Nigeria.

Abstract

Computer Anxiety, Phobia, Obsession and Work Stress at the University of Ibadan, Nigeria: Part 1 - Prevalence and Correlates

A. Ajayi, W.M. Olatokun and M.A. Tiamiyu

Africa Regional Centre for Information Science

6 Benue Road, P.O. Box 22133

University of Ibadan, Ibadan, Nigeria

arcis@infoweb.abs.net

Abstract

The study investigated the prevalence and correlation of computer-related behavioural variables among students and staff of the University of Ibadan, Nigeria. The behaviours were information anxiety, computer phobia, obsessive computing, and computer work stress. Validated scales were designed to measure these behaviours, and descriptive and correlational analyses were performed. Information anxiety and obsessive computing were prevalent among the respondents, but computer phobia was not. Work stress correlated directly with both information anxiety and computer phobia, and computing experience correlated inversely with information anxiety, computer phobia and obsessive computing.

Introduction

As technological progress produces more capable and less expensive IT, there is a strong impetus towards developing and using computer systems in all human activities. Word processing systems have almost entirely replaced typewriters in offices, and sophisticated information technology (IT) tools such as computer-assisted design/manufacturing are being used to create new information and artifacts. In developed countries where IT infrastructure, services and use are highly advanced, there have occurred dramatic changes in the nature of education, work and leisure. These changes, along with economic growth and expansion of IT infrastructure and services, have been mutually reinforcing, and have led to the emergence of what is often referred to as 'computer culture' in those countries.

Nevertheless, socio-economic analysts are sharply divided on the potential impact of the information age on people and societies. Economists and businessmen often paint rosy pictures of IT-propelled productivity, growth and development. However, others, usually sociologists, psychologists and humanists, are concerned about the potential negative effects of computer age developments on people, particularly the growing intrusion of computers in people's lives, attitudes and perceptions. Among the effects are computer phobia, computer anxiety, computer addiction, computer work stress, social alienation, technological obsolescence of skills, etc. For instance, Slam et al. (1990) have predicted that the information age would be characterised by technological obsolescence of people with highly specialised skills. Job insecurity among the older workers would increase, and anxiety about potential redundancy and job losses might induce stress and phobia of the technology, as well as schism between the young and old (Gottfried, 1981).

IT culture is nascent in developing countries and that might create the illusion that people in these countries are immune to the negative effects of the computer age. We need only remind ourselves that most of the effects were noticed in developed countries only after transformations were noticed in people's lifestyles. Our previous analysis of the recent trends in computing skills requirements in Nigeria (typical of most developing countries) shows that some of the pressures of the information age are already being felt in Nigeria. These include the pressure to become computer literate, and thereafter, to keep up with new IT. A pertinent question is whether developing countries should embrace IT without reservations now and worry about the negative effects later, or pursue rapid IT development while simultaneously seeking to understand and guard against the expected negative effects. There is probably no easy answer. Worrying too much about the potential negative effects of the new technologies could discourage the vigorous development and exploitation of the technology for development. Conversely, not caring about the potential negative effects would imply that developing countries would not have learnt from the history of the evolution of the technology in developed countries. In any event, we believe that developing countries must strive to understand how their pursuit of ITs for growth and development might, within their own socio-cultural environment, positively or negatively affect their societies and peoples.

Accordingly, we designed this study to answer the following research questions: (i) how prevalent are the computer-related behaviours such as information anxiety, computer phobia, obsession and work stress in Nigeria - a developing country? (ii) What are the interrelationships among the computer-related behaviours? (iii) What are the demographic, personality and other determinants of the behaviours?

This paper presents aspects of the study pertaining to the review of concepts, the methodology, as well as the prevalence of, and correlation among the computer-related behavioural variables. Aspects of the study that modelled the demographic and psychosocial determinants of the computer-related variables will be presented as the second part in the next issue of the journal.

Literature Review

We review here the computer-related and personality variables that formed the focus of the study. Review of empirical studies of the relationships among these and demographic variables are deferred to the related paper.

Computer-related behavioural variables

Information anxiety: General anxiety is a psychological condition whereby an individual worries about most things with which he/she relates in the environment - home, work, relations, friends, past and future events, etc. Persistent general anxiety often reflects a psychological disorder (Barlow et al., 1986), or an abnormal emotional condition (Spielberger, 1972). Accordingly, information anxiety is described as persistent and unwarranted worry by an individual about not having enough information notwithstanding the amount possessed. Information anxious people would often engage in persistent search for information in books, computer systems and other sources, and are more likely than others to procrastinate on crucial decisions pending the acquisition of more information. Marchand and Horton (1986) argue that information anxiety is a manifestation of stress caused by an accelerated demand for people working with electronic technologies to be highly productive, leading to a syndrome that can be termed over-achieving. Such people might then begin to feel that they are in a kind of race to produce and use more and better information faster.

Computer phobia: Phobia is defined as an intense, persistent, irrational or exaggerated fear of an object or situation of sufficient potency to result in a strong desire to avoid the phobic object or situation despite the knowledge that the fear is unreasonable (Riskind & Mercier, 1994). Hence, computer phobia means a debilitating fear of computer systems, including the hardware and software, and might pertain to usage or analysis/design of such systems. Computer phobia might manifest in different ways: fear of computers as threat to accumulated experience with manual systems, or embarrassment or fear of operating a computer in front of subordinates or peers. Such abnormal behaviour can be fuelled simply by the fear of change in job status and esteem (Floyd, 1987), or by experience of a disaster during a previous interaction with a computer system.

Obsessive computing: Unlike computer phobia, obsessive computing refers to intense attraction or prolonged attachment to computer systems. Individuals exhibiting this behaviour often spend too much time with computer systems. This is what is often also referred to as 'computer work enmeshment' or 'computer addiction'. Obsessive computing, like many other obsessive or compulsive behaviours, might result from a psychological disorder (Barlow, 1986), or from information anxiety induced by information age developments (Marchand and Horton, 1986). One variation of computer addiction is Internet addiction (Brenner, 1987).

Computing work stress: Stress is usually defined as the result of an inadequate bodily response by an individual to an environmental action, situation, or event that places excessive psychological and/or physical demands upon the individual (eg. Ivancevich et al., 1983). Computer work stress might be expected from two main sources - when people struggle to learn to use computers or new technologies, and also when computer experts must coordinate and manage complex computer systems projects. Slam et al. (1990) agree that new technologies are inherently stressful; and Schreuder (1987) has observed that information systems development is a threatening process, which often causes fear and stress among both designers and prospective users.

Personality variables

The concept of personality is based on the assumption that people have more or less stable patterns of behaviour across different situations, but that these patterns might also differ from one person to another. Personality traits are considered to be enduring and are expected to influence various aspects of behaviour, such as interaction with computer systems. Three personality traits were considered relevant to the study in terms of their potential influence on computer-related behaviour: locus of control, personality type A/B, and self-esteem.

Locus of control is a personality trait incorporated by Rotter (1966) into his social learning theory. It indicates the degree to which people consider their lives to be under their own or others control. Some people tend to attribute their situation mainly to their own personal efforts (internal factors), whereas others tend to attribute their situation mainly to objects or events in their environment (external factors). This is the basis of the notion of locus of control - internal or external. Hence, people exhibiting internal locus of control would believe that the acquisition of computing expertise depends primarily on personal effort, and are likely to self-motivate themselves to acquire the experience. Conversely, those with external locus of control would only be motivated or forced to acquire computing expertise by such circumstances as the exigencies of work, encouragement by others, chance or easy access to computers, etc.

Personality type A/B: Psychologists also suggest that individuals could be described as exhibiting either type A or type B personality. Type A individuals tend to exhibit achievement striving, excessive drive, extreme comprehensiveness, impatience, aggressiveness, and an acute sense of time and urgency. The absence of these features in an individual describes the type B personality. Hence, Type B individuals would be easy going, less frantic, less likely to do two things at once, and consistently less hostile. Accordingly, one would expect that type A individuals would be more information anxious, would tend to compute obsessively, and hence, would be more computer work stressed than their type B counterparts.

Self-esteem refers to an individual's feelings of personal worth. Lowly self-esteemed people are expected to have low opinions of themselves. They would often not believe that others like them or that they are important. They hold negative attitudes about themselves, including thinking they are clumsy, useless and a burden to others. Conversely, highly self-esteemed people would feel they are smart, very useful and indispensable to others, and would expect others to like them. Generally, lowly self-esteemed individuals would be expected to be more computer-phobic than their highly self-esteemed counterparts, although they, actually, might be more experienced with computer systems than they are willing to believe.

Methodology

We situated our study in the environment of tertiary education, particularly the university setting. The paucity of computing skills in Nigeria is largely due to the non-integration of computing into the Nigerian educational curriculum especially at the primary and secondary levels. Accordingly, the university environment was considered most suitable for the study because that is where levels of awareness of the computer age and its demands are most likely to be greatest. The university environment is science- and research-oriented, and is populated by students, faculty and other staff who are more likely to have related with computer systems and computer age developments at work or in school than other groups in the Nigerian society. A social survey research method was used for the study.

Population and sampling

For ease of data collection, we narrowed our target population to the students and staff of Nigeria's oldest university - the University of Ibadan. We also stratified the population for sampling into staff and students from the (i) computing-intensive units of the university (viz. Department of Computer Science, Africa Regional Centre for Information Science, the University Management Information System Unit, Computing Centre), who were most likely to use, analyse and design computer systems frequently in their teaching, learning and other work; and (ii) other units of the university who

were less likely to interact with computer systems frequently. The systematic random sampling method was used as much as practicable to select respondents from lists of staff/students in the units.

A structured questionnaire was used to collect data. The nine sections of the questionnaire collected data on respondents' (1) demographic attributes - age, sex, occupation and discipline (2) computer expertise, (3) information anxiety, (4) computer phobia, (5) obsessive computing, (6) self-esteem, (7) locus of control, (8) personality type, and (9) computer work stress. (See the Appendix for scale items).

Computer expertise referred to the level of an individual's knowledge, skills and experience with computerised information systems. Computer expertise was defined in terms of the nature, duration, frequency and/or cognitive requirements of interaction with computer systems. Computer expertise was measured by asking the respondents to indicate the computer-related education and training they had had, as well as the computing activities that they had performed or could perform. The computing activities included use of different operating systems, use of different application packages, programming tasks, and participation in software or system analysis, design and/or management. An index of computer expertise for each respondent was then obtained by weighting and summing the scores on the indicated knowledge and activities.

Information anxiety of respondents was measured with a specially constructed scale (see the Appendix for the items included in this and other scales). Cronbach Alpha for the information anxiety scale was = .6376.

Computer-phobia was measured by a Likert-type scale that assessed the respondents' level of fear of computer systems and general attitudes and feelings towards computers and computerised information systems. (Alpha = .8437).

Obsessive computing behaviour was measured with a scale which measured the level of intense attraction to computers, computing activities and intensity of efforts by respondents to maximise their computing capabilities (Alpha = .8002).

Self-esteem was measured by adapting a Likert-type scale originally developed by Adanijo and Oyefeso (1986) who reported a split-half reliability of 0.79 among bank officials, and a stability of 0.74 and 0.92 among undergraduate and high school students respectively (Alpha for adapted scale = .7369).

Locus of control of the respondents was measured by adapting Rotter's (1966) 29-item forced-choice scale that measures the internal/external locus of an individual. Each item on the scale had two alternatives indicating external or internal orientation respectively, and from which respondents had to select one. Rotter's scale had content validity and reliability of 0.71 and 0.68 respectively (Rotter, 1966). Cronbach alpha for our adapted 10-item scale was .6156.

Personality type A/B inclination of the respondents was measured by a specially-designed 10-item scale for determining whether a respondent preponderantly exhibited personality traits of either type A (achievement striving, extreme comprehensiveness, a sense of urgency, excessive aggressiveness, etc), or type B (easygoing, less frantic, less likely to do many things at once, amiable, etc. (Alpha = .7163).

Finally, *computer work stress* of the respondents was measured by a scale comprising ten items, which assessed respondents' perception of, and reaction to, the demands of computing work (Cronbach alpha = .7563).

Data were collected during 1999. Two hundred copies of the questionnaire were distributed, but only 137 of the returned copies were found usable. The sample comprised of students (69%) and staff (31%), and 29% of the respondents were from computer/information departments/units, while 71% were from other departments/units. Respondents had an average age of 26 years, with 91% of them less than 35 years of age. Also, 42 % of the respondents had not yet begun using computer systems at the time of the survey, 9% were just starting to use computer systems, 47% had been using computers for between one and nine years, and the remaining 2% for more than 10 years.

Analysis and Discussion

Descriptive analyses

We began the analyses by first examining the means and variances of respondents' scores on the computer-related variables - information anxiety, computer phobia, obsessive computing and works stress. These are shown in Table 1. One-sample t-tests confirmed that the mean scores for obsessive computing (4.090) and information anxiety (3.662) were significantly higher than 3.0, the theoretical mid-point of the 5-point Likert scales used for collecting data on the variables. Hence, we can conclude that both obsessive computing and information anxiety were prevalent among the respondents. In view of the limited access to computing facilities within and outside the campus, however, it is possible that the high scores on obsessive computing reflected desire for, than actual incidence of obsessive computing among the respondents. Conversely, the mean score on computer phobia (2.642) was significantly lower than

3.0, indicating a relatively low prevalence of computer phobia among the respondents. Secondly, notice that the mean score on obsessive computing was the highest, followed by the mean scores on information anxiety, work stress and computer phobia in that order. Thirdly, as indicated by the standard deviations of the variables, the variability of respondents' scores was relatively lowest for obsessive computing, followed again by information anxiety, work stress and computer phobia in that order. These results show that obsessive computing was most prevalent and also least varying among respondents, whereas computer phobia was the least prevalent and the most varying among the respondents.

Table 1: Information/Computing behaviour: descriptive and T-test* analyses

Variable	Mean	S.d.	T value	d.f.	2-tail p
1. Information anxiety	3.662	.574	-4.888	136	.000
2. Computer phobia	2.642	.857	25.737	136	.000
3. Obsessive computing	4.090	.496	13.474	136	.000
4. Work stress	3.082	.634	1.522	136	.130

* One-sample t-test comparing mean of variable with 3.0, the theoretical mid-point of a 5-point Likert scale.

Correlation analyses

Next, we examined the interrelationships among the four computer-related variables (Table 2). Information anxiety did not significantly correlate with computer phobia. In other words, there was no tendency for highly or lowly information anxious respondents to be also highly or lowly computer-phobic or vice versa. However, information anxiety correlated significantly and directly with work stress (Pearson $r = .3092$, $p < .01$). That is, highly information anxious respondents tended to be also highly computer work-stressed and vice versa. Finally, information anxiety correlated significantly inversely with obsessive computing ($r = -.2794$, $p < .01$), implying that information anxiety could not have been the determinant of obsessive computing among the respondents.

Computer phobia did not correlate significantly with obsessive computing. This is not surprising because the two behaviours are likely to be induced by different sets of factors rather than the presence or absence of the same factors. In particular, whereas computer phobia is rooted in fear and aversion, obsessive computing relates to addictive and compulsive habits.

Computer phobia correlated significantly and directly with work stress ($r = .3140$, $p < .01$). However, alternative interpretations of this finding are possible: work stressed individuals might develop computer phobia because they want to avoid the stressor, i.e. continued interaction with computer systems. Secondly, it is possible that fear of computers - computer phobia - induces work stress when such an individual must work with computers.

Table 2: Information/Computing behaviour: correlation analysis

Variable	1	2	3
1 Information anxiety			
2 Computer phobia	.0320		
3 Obsessive computing	-.2794*	.1339	
4 Work stress	.3092*	.3140*	-.1681+

+ Significant at the 5% level;

* Significant at the 1% level.

Finally, obsessive computing correlated significantly but inversely with work stress ($r = -.1681$, $p < .05$). Hence, obsessive computing could not have been responsible for increased work stress among the respondents. Alternative explanations are that obsessive computing was more of a leisurely than a job-related activity among the respondents; or that the level of job-related obsessive computing was physiologically tolerable and psychologically enjoyable. Obsessive computing would contribute to work stress only when it is forced and/or becomes mentally monotonous and/or physically tiring. In Nigeria, as in many developing countries, using or working with computers is considered by many as very glamorous because of the severely limited access to computing opportunities in school and at home and work. Hence, the opportunity of access to computing facilities might be seen more as a skill-enhancing advantage than a stress-inducing liability.

Summary and Conclusion

Information anxiety did not correlate significantly with computer phobia, suggesting that fear of the computer was not correlated with anxiety about information. This should not be surprising because people could conceivably exhibit information anxiety in either manual or computerised information systems.

However, information anxiety correlated directly with computer work stress (as expected) and computing expertise (as expected), and obsessive computing (unexpected). In respect of the unexpected finding, we had expected that high

information anxiety would have induced high obsessive computing as predicted by Marchand and Horton (1986). The unexpected finding might be attributed to the possibility that obsessive computing among the respondents was motivated more by leisure than work or studies.

Computer phobia correlated directly with computer work stress, implying that computer phobia might induce or be induced by work stress. Obsessive computing correlated inversely with computer work stress. This suggests that computer work stress probably discouraged obsessive computing.

The study was able to evaluate the prevalence and inter-correlation of the computer-related variables among students and staff of a Nigerian university who, as noted earlier, are generally more aware and exposed to computer age developments than most other socio-economic groups in the country. Apart from replicating earlier studies and contributing to our understanding of the potential effects of the computer age on people and societies, the findings of the study also provide insight to the factors that might influence the effectiveness of strategies for improving computer attitudes and skills among organisational personnel in Nigeria and other developing countries.

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Appendix: Questionnaire Scale Items

Information anxiety (9 items, Alpha = .6376)

- I always feel I do not have enough information materials.
- I worry too much about sourcing for and acquiring more information.
- I believe it is better to be overwhelmed by much more information than to lack it.
- I often feel I do not have as much information materials and sources compared to my friends/colleagues.
- I feel I am okay with what I know.
- I feel unpleasant sometimes because I lack adequate information.
- I believe that reading novels is a useful pastime.
- I believe Internet access is a must nowadays for access to many information sources
- I read even when I am not preparing for exams.

Computer phobia (11 items; Alpha = .8437)

- I don't care what other people say or feel, computers are not for me.
- If I have to use a computer, it would probably be more trouble than it is worth.
- I feel pleasant when I hear about computer.
- I feel restless when I have to use a computer.
- I feel computer literacy should not be part of requirements for securing a job.
- I am always apprehensive when I want to use a computer.
- Computer makes too much demand on a person's thinking ability.
- Computer should best be avoided.
- Introduction of computer to job functions may cause unemployment.
- I experience emotional discomfort using computer.
- Computers are necessary evil in the society.

Obsessive computing (10 items, Alpha = .8002)

- Do you work late on the computer very often?
- Do you often forget to go on break because of the work you have to do on the computer system?
- Does your use of computer cause some of your other activities to lack adequate attention?
- Do you think you spend more time on the computer than necessary?
- Do you enjoy the time you spend working on the computer more than being with your friends?
- Does your spouse see your working with computer as competing with her for your attention?
- Do you find it hard to quit using the computer because there is always one more new thing to look at/learn?
- Do you experience restlessness or depression when you cannot use the computer for any reason?
- Can you attribute any problem in your work/personal/social life to too much time spent on the computer?
- Do your friends see you as antisocial because of your use of the computer?

Self-esteem (15 items, Alpha = .7369)

My efforts always produce poor results.

I always try to lead any group I find myself.

In order to get along and be liked, I tend to be what people expect me to be rather than my true self.

I rely on my friends or others to advise me on how to solve my personal problems.

When in a group, I am unlikely to express opinion because I fear others may not think well of me.

I feel inferior to some of my friends.

If I hear that someone expresses a poor opinion of me, I do my best to please him/her.

I think I am confident enough to speak in front of a group.

I feel self conscious when I am with people who have superior position to mine at work/school.

I sometimes criticise myself afterwards for having acted silly or inappropriate in some situations.

I become panicky when I think of something I might do wrong in future.

I do not believe much in my ability.

When I am in a group, I don't usually say much for fear of saying wrong things.

I live too much by other peoples' standards.

Although people sometimes compliment me, I feel that I do not deserve the compliments.

Locus of control (10 items, Alpha = .6156)

I can anticipate difficulties and take action to avoid them.

A great deal of what happens to people is probably a matter of chance.

I can control my problems only if I have outside support.

Mistakes and problems are my responsibilities to deal with.

My life is controlled by outside actions and events.

People are victims of circumstances beyond their control.

I believe a person can really be master of his/her own life.

I believe there is no shortcut to success and that whatever you get is by hard work.

How successful you are depends on how dedicated and hardworking you are.

A great deal of what happens to me is probably a matter of chance.

Type A/B personality (10 items, Alpha = .7163)

Do you strongly express key words in your everyday speech?

Do you believe that children should be taught to be competitive?

Do you hurry other people to get on with what they are trying to say?

Do you try to eat and shave or drive and jot down notes at the same time?

Do you bring conversation around to topic of concern to you?

Do you find that you are so wrapped up in work that you no longer notice scenery or office decorations?

Do you try to schedule more and more activities into less time.

Do you clench or punch your fist or use other gestures to emphasise your views.

Do you feel that things must be done now and quickly.

Do you insist on winning at games rather than having fun.

Computer work stress (10 items, Alpha = .7563)

Computer work can be time consuming.

Computer work is monotonous.

Computer use interferes with my social and private life.

Computer use disturbs the time I spend with my relations.

Computer technology is changing so fast that I find it difficult to cope.

Information systems design is very stressful.

Writing of software programs takes too much of mental effort.

Software programs can be very frustrating when they fail to run.

You cannot rest if you are in the information profession.

I sometimes experience physical strain (eg. headache) after working on the computer.

Computer experience (Variables used to measure level of computer experience)

Nature/level of computer/information science qualifications.

Duration of experience with computer systems.

Familiarity with packages for word processing, spreadsheets, graphics, statistics, DBMS, communications, etc.

Familiarity with data processing, programming, scientific computing, networks, AI, etc.

Familiarity with programming languages.

Participation in system analysis/design.

Participation in software development.

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- * M.A. Tiamiyu is the Acting Director, Africa Regional Centre for Information Science, University of Ibadan, Nigeria. He attended the University of Ibadan, Nigeria and the University of Western Ontario, London, Canada. He holds B.Sc. Economics, M.Sc. and Ph.D. Information Science.
 - * A. Ajayi is a graduate of the Africa Centre for Information Science, University of Ibadan, Nigeria. He holds M. Inf. Sc.
 - * W.M. Olatokun is a lecturer at the Africa Centre for Information Science, University of Ibadan, Nigeria. He holds M. Inf. Sc.

A Comparative Study of Subject Specialisation at the University of Botswana and the Rand Afrikaans University Libraries

Edwin Qobose

University of Botswana Library

P/Bag 00390

University of Botswana

Email: Qobose@mopipi.ub.bw

Abstract

The University of Botswana Library and the Rand University Library have both adopted subject specialisation approach in the delivery of their services. The article seeks to establish similarities and differences in the application of subject specialisation in the two libraries. The findings reveal interesting comparisons from which both can learn and improve on their services. Subject librarians at the University of Botswana spent relatively more time on technical- related functions, whilst the information librarians at Rand Afrikaans concentrate more on customer- centred services. Automation is viewed as an indispensable tool for quality services in both cases. It concludes by highlighting the importance of customer services, which are inherent in subject specialisation.

Introduction

During the past forty years, there has been a major shift from functional to subject approach among academic libraries worldwide. Accordingly, there have been changes in staffing patterns and structures, notably the emergence of a new breed of professionals called subject librarians. The main functions of subject librarians are to develop and organise the collections, provide subject specific reference and information services, and subject oriented library instructions.

A subject librarian or information librarian is a subject specialist given the responsibility of providing services in assigned subject areas. In the academic research library, these services include collection development and skilled assistance to customers in maximising the use of the collection. Ogundipe (1983) explained that 'subject specialist' is used as an umbrella term for many variations such as subject librarian, information officer, library liaison officer and faculty librarian. Feather and Sturges (1997) define a subject librarian as a librarian with special knowledge and responsibility for a subject or a group of related subjects.

Subject specialisation is a relatively recent phenomenon in Africa compared to the industrialised countries. Several reasons account for this, but this is mainly due to lack of qualified personnel and limited funding (Fadiran, 1982) and also the perception of the profession in Africa (Ochai, 1991). But subject specialisation in Europe and North America has been practised for several years. This topic has been well documented in several studies in the past forty decades. Woodhead (1982) traced the evolution of subject specialisation in British university libraries and identified five categories of such specialisation. Holbrook (1984) studied the problems and techniques of establishing liaison with the faculty and students in the British university setting. More recently, Walton, Day and Edwards (1996) described the changing role of subject specialists in the era of information superhighway in the UK. The conclusion is that there are vast advantages derived from subject specialisation.

There are, however, fewer studies on subject specialisation in developing countries. Some of these are: Avafia (1983) who studied the concept of subject specialisation in the context of some African university libraries. He recommended that African university libraries should consider adopting this new service approach. Ogundipe (1983) advocated a system of library management based on subject specialisation for African University libraries. Bandara (1986) considered subject specialisation in university libraries in developing countries, and identified problems peculiar to African librarians. Prozensky (1986) described the major functions of subject librarians at the University of Natal, South Africa. These are primarily technical duties, other than information retrieval. Ochai (1991) examined the Nigerian university library situation. He argued for subject librarian with specific subject background in addition to library science. But there is a shortage of librarians of this calibre in Africa. Jenda (1994) undertook time management study of the University of Botswana Library (UBL) adoption of subject centered library model when she examined the multiple functions of subject librarians. Both the positive and negative aspects of this approach are discussed. However, it would appear that there are more disadvantages than advantages in this case.

The present study compared the practice of subject specialisation in two university libraries, in Botswana and South Africa. It sought to establish the similarities and differences in the application thereof, and thereby suggest ways in which subject specialisation system can be improved. The University of Botswana Library (UBL) and the Rand Afrikaans University Library (RAUL) are two academic libraries in Southern Africa that have adopted subject centred library organisation. In UBL, professional librarians are referred to as subject librarians, whilst the subject specialists at RAUL are termed information librarians.

Background Information on the Two University Libraries

University of Botswana

University of Botswana was established by an act of parliament in 1982. The University offers a wide range of undergraduate and graduate programmes in six faculties of Business, Education, Engineering & Technology, Humanities, Science and Social Sciences. Over the years, this University has evolved to become a regional centre of excellence in select disciplines. This has a direct bearing on the provision of adequate curriculum-based information sources by the University library. UBL consists of the main campus library, and the two branch libraries - one at the Faculty of Engineering (FET) and the other at the Centre for Continuing Education (CCE) in Francistown. The total book collection is about 250,000 volumes, 1,500 periodical titles and some 35 CD-ROM title subscriptions. The library has a full complement of 25 professionals and 90 paraprofessional staff. It serves the population of some 9,000 students, 500 faculty members, plus 300 registered external patrons. The two branch libraries are connected to the main library network in Gaborone. The library is partially automated, and is a participant in the regional library network, SABINET (South African Bibliographic NETwork).

UBL adopted subject specialisation in 1981, and introduced four teams of subject librarians. These are Education, Humanities, Science and Social Sciences. The two new teams added recently are Business and Engineering & Technology. The minimum entry requirements for a subject librarian are a relevant subject degree, other than library science, plus a professional qualification, i.e. a postgraduate diploma or Masters in Library Science. A subject librarian is normally assigned one or a cluster of related subjects. A subject team consists of two or more librarians. The primary function of a subject librarian is collection development, subject indexing, reference/information services and user education in liaison with relevant departments. The philosophy of subject librarianship is that it provides the best climate for customer services through the strong liaison. Under this arrangement, subject librarians are directly under the Deputy librarian, but they are answerable to the three coordinators for everyday functional activities.

The Rand Afrikaans University

The Rand Afrikaans University (RAU), South Africa was established in 1967 as the academic home of the Afrikaans speaking students on the Witwatersrand area. The new campus, which was inaugurated in 1975, is a high-tech, compact and multi-functional university complex in the heart of Johannesburg. RAU has gradually changed its perspective by accommodating widely divergent student population from all language groups within and outside South Africa. Today, the two languages of instructions are Afrikaans and English. RAU has a student population of 23,000 and a complement of more than 400 permanent academic staff. It consists of six faculties of Arts, Education and Nursing, Economics and Management Sciences, Engineering, Law, and Science. In addition to an increasing number of undergraduate students, there are a number of postgraduate courses in at least eighteen academic departments. In recent years, RAU has introduced various distance education and continuing education courses in a number of disciplines. RAUL has a total of 440,000 volumes and some 44 CD-ROMs titles. There are four small periodicals departmental libraries, which keep current issues only in the Faculty of Science. RAUL adopted subject specialisation in 1967, and subject specialists were then referred to as subject librarians until in the 1980s when they changed to information librarians in order to reflect their increased role in information provision. The academic requirement for information librarians is any of the following: Lower or Higher diploma, Honours or Masters degree in library and information science. Any additional subject degree is an added advantage rather than a requirement. The two major areas of information librarians' responsibility are information management and user education. Information librarians conduct literature searches and undertake bibliographic instructions for students and academic staff in their respective departments.

Methodology

The observational technique was used in this study. The researcher has been working at UBL for the past eighteen years. He also spent about three months at RAUL. Using the observation technique, he observed the practice of subject specialisation in the two libraries. Observational technique used in the study has some shortcomings, in that observation at RAUL was relatively shorter compared to that of UBL. Secondly, a twelve-item questionnaire was sent to all subject specialists in these two libraries. It solicited information on the following major areas: qualifications, subject specialisation, professional workload breakdown, primary functions of subject librarians and the impact of automation on their functions.

Findings and Discussion

Fifteen copies of the questionnaire were administered to RAUL and 20 to UBL staff. Ten were returned from RAUL, which represents 67% response rate, and 100% response was recorded at UBL.

Table: Professional workload at the universities

Work load	UBL (%)	RAUL (%)
Collection development	20	10
Reference/information	15	22
User education	20	23
CD-ROM searches	10	25
Faculty Liaison	15	10
Information organisation	20	10

The table above shows that information librarians at RAUL spent a lot more time in customer-centred activities; this accounted for almost 80% of time (reference/information, user education, CD-ROM searches, faculty liaison). The remaining 20% was allocated to technical and other related work (collection management and information organisation). On the other hand, subject librarians at UBL spent 40% of their time on these technical activities. User services took the remaining 60%. This shows the hybrid model of subject specialisation at UBL, as suggested by Jenda (1994).

The fact that subject librarians at UBL spent 40% of their time on collection development and information organisation, compared to a mere 20% by their counterparts at RAUL, could be explained partly by the fact that all subject librarians at UBL had a relevant subject degree in addition to the professional qualification and, therefore, had a greater autonomy over the selection of materials. Secondly, the budgetary allocation policy of each library may also influence the level of participation by faculty members. Information librarians at RAUL had professional qualifications, but not necessarily a subject degree. Consequently, the academic staff have greater control over selection of library materials. However, this argument is challenged by Williams (1991).

When respondents were asked to state the positive aspects of subject specialisation more than 70% of the respondents mentioned that this arrangement promotes greater partnership with both academic staff and students, thereby encouraging effective and efficient delivery of services to customers. This approach provides for a holistic service and better understanding of the requirements for overall effective service to a given subject.

Subject librarianship at UBL, in particular, has ushered in a new era; there is greater work variety, and a better chance for increased intellectual stimulation and professional development. A majority of the librarians (85%) felt they were in a better position to serve their customers. They had become familiar with their collections, and developed a much broader perspective of the information needs of both students and staff.

When respondents were asked about the disadvantages of subject specialisation, one of the disadvantages mentioned was that it is an expensive operation with a demand for professional staff with a specific subject degree and professional qualification. The implication of this is that someone can only fill the position of a subject librarian with a minimum of a Bachelor's degree. Jenda (1994) has confirmed that subject-centred library organisation requires more professional staff to run effectively than a functional type.

Furthermore, it is likely to promote parochial minded professionalism in that one may specialise at the expense of other professional duties. Contrary to other views, 55% of UBL respondents felt that subject librarians were expected to do multiple tasks. These include all professional duties such as collection development, classifying and indexing, reference and user education programmes and other library routines. This is regarded as an overload.

On the impact of library automation on performance and the role of the subject librarians, RAUL is fully automated and offers more customer services than UBL which is partially automated. Library automation or computerisation has been embraced as an indispensable tool rather than a threat by both libraries. Librarians are now able to offer better and faster services than ever before while the quality of such services is also enhanced. Automation ensures timely and accurate provision of relevant information from the national as well as international sources. Above all, automation empowers librarians as gatekeepers of information. And more than ever before, the issue of librarians being replaced by computers is out of the question. Rather, librarians who keep abreast of IT developments will replace the traditional ones.

Conclusion

Subject specialisation is being adopted by many academic libraries. Generally, the advantages of this approach outweigh the functional approach in many ways. The respondents from the two university libraries articulated these advantages. UBL and RAUL have changed from the classical hierarchical structure to a matrix environment, which encourages participatory management style. Similarities that can be drawn from these libraries are that they have a common philosophy and subject specialisation is the basis of library organisation. Both libraries have technical services sections which focus on managing and maintaining quality databases. Library automation is used to enhance services and facilitate access to local and remote databases. There is however a difference in the application of subject specialisation in these two libraries. At UBL, subject oriented organisation is more of a hybrid in that it uses both aspects of traditional organisation and subject-centred one. It has grafted subject specialisation onto the traditional functional structure. Subject specialisation at RAUL is not pure either, in the true sense of the German model of academic libraries, where the emphasis is on appropriate academic qualifications, and the predominance of book selection (Williams, 1991). Subject specialists spent more time on customer services and very little time on book selection.

Whatever the case, the challenges facing subject specialists are the increasing student numbers, some without any library skills, and others with limited exposure to information seeking skills. Subject librarians have to come up with appropriate information skills packages that suit both groups. In addition, subject specialists have to take cognizance of new teaching techniques such as resource based learning. The success of this depends largely on building good relations with the faculty members. Liaison with academic staff forms the cornerstone of subject specialisation. Subject specialisation in African academic libraries is here to stay, as it is difficult to imagine libraries reverting to the functional approach in this era. In view of the growing importance of information technology and a trend towards student-centred approach to learning, the need for subject-centred orientation in libraries becomes even more crucial.

Subject Librarians at UBL would do well to refocus their attention on more user-centred services like database search services. This is more so with the recent increase in graduate student population who come with sophisticated research needs. RAUL information librarians, on the other hand, should empower themselves to participate fully and actively in collection development if their subject specialisation is to be meaningful. Subject specialisation is dynamic and it has to be reviewed from time to time in an attempt to improve and introduce innovative and quality services to customers.

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*Edwin Qobose is currently Deputy Director, Customer and Extension Services, University of Botswana Library Services. He attended the National University of Lesotho and Dalhousie University, Nova Scotia, Canada. He holds the BA and MLS degrees.



E. QOBOSE

Retrospective Conversion of Card Catalogue at the National University of Lesotho Library

Kebede Hundie

*The National University of Lesotho Library
P.O. Roma 180, Lesotho*

Abstract

The National University of Lesotho Library has fully computerised all its housekeeping routines and one of the major achievements in this regard is the automation of its card catalogue. Currently, about 90% of the library's card catalogue has been converted to machine-readable format. This article reports how the retrospective conversion project was carried out at the National University of Lesotho Library from July 1996 until December 2000. Also, the article describes the conversion methods employed, procedures followed, and pre-conversion preparations made by the library to automate its card catalogue and to assign barcode labels to the collection. Finally, it concludes by highlighting problems encountered throughout the project and by giving statistical figures relating to success rates of the project.

Introduction

The National University of Lesotho (NUL), which is the only university in the country, was established in October 1975. It was established as Pius XII University College in 1945, which subsequently became the University of Basutoland, Bechuanaland Protectorate and Swaziland in 1964, and after independence of the three countries it became the University of Botswana, Lesotho and Swaziland in 1966. Occupying the same site and grounds as its predecessors, NUL is situated at Roma, some 34 km south-east of Maseru, the capital of the Kingdom of Lesotho. The University has eight faculties and four institutes. It offers both undergraduate and postgraduate programmes.

The university library system consists of the main Thomas Mofolo Library (TML), which was named after the great Mosotho (a citizen of Lesotho) writer of the 19th century, as well as branch libraries on different campuses in Maseru, such as the Institute of Extra

Mural Studies (IEMS), Faculty of Agriculture, and Faculty of Health Sciences libraries.

The current holdings of the University library system comprise approximately about 205,150 volumes of printed materials including bound periodicals that were collected since its inception. Audiovisual materials, microforms, and bibliographic and full text CD-ROM databases are also among its collection. Moreover, its users have access to thousands of EBSCO electronic journals via the Internet. At present, the University library system serves an estimated population of over 3,000 students, both full-time and part-time, and about 629 staff members, both academic and non-academic.

The University library system was manually operated at its inception. A library automation project was started at the beginning of 1994. From March to October 1994, feasibility studies were carried out to automate the housekeeping routines of the libraries and a turnkey library system was recommended. But securing funds for the project was a major difficulty until February 1996 when the World Bank agreed to fund the project. Through this funding the TML acquired all the necessary computers including a file server and *Stylis* library management system that was developed in South Africa. The installation of the local area network (LAN) in the library was completed by January 1996.

Retrospective conversion is the process of turning existing card catalogue records, mostly shelf lists, into machine-readable form and searchable records. In essence, this refers to materials that have already been catalogued but that do not have records in the library online catalogue. It is the first and major step in the process of computerising library housekeeping functions (Sheaffer, 2000) as the database that contains bibliographic records in a standard format is the very foundation of most of the services that a library provides. Olorunsola (1997) observed that it is one of the most costly, intense, and time-consuming exercises especially for libraries with huge collections. However, there has been an argument against its cost, as it is said that the cost of not performing retrospective conversion is paid for by library users in the time they spend locating materials, as given in the *Retrospective Conversion: Guidelines for Libraries* written by the OCLC.

In this regard, before committing itself to undertake a retrospective conversion project, a library should have clear and justifiable reasons. Libraries embark on a retrospective conversion project for several reasons. In their guide to retrospective conversion project, Beaumont and Cox (1989) stated, among others, that the reasons to initiate a

retrospective conversion project, as the need to improve service to users; integrating acquisitions and cataloguing functions; generating special products, such as reading lists; maximising returns on automation expenditures; and providing easy backup for the entire catalogue.

Generally speaking, there are several methods of retrospective conversion available today ranging from manual transcription of card catalogues to a fully automated OCR technology. The recent *Retrospective Conversion: Guidelines for Libraries* of the Ohio College Library Centre (OCLC) outlines the brief description, advantages, and disadvantages of various methods of a retrospective conversion project.

Nowadays, retrospective conversion is mostly done by matching and extracting machine-readable records from bibliographic databases, keying records from shelf lists directly into a database, or by combining the two methods. When it comes to actual undertaking of a retrospective conversion project, libraries can either outsource retrospective conversion to vendors or do it in-house. The trend has been that most libraries outsource retrospective conversion because there exists quite a number of external sources such as Library of Congress (LC), Ohio College Library Centre (OCLC), South African Bibliographic NETWORK (SABINET), and many others.

To choose the best conversion method(s), libraries should take into account their collection type and size, budget, quality demands, time constraints, and staffing situation as pointed out in the *Retrospective Conversion: Guidelines for Libraries*. Olorunsola (1997) also emphasises that the best conversion method essentially depends on the type of materials to be converted and the resources of the library.

Preparing for Retrospective Conversion

Preparatory steps are very necessary before commencing the actual retrospective conversion tasks. Since the end product of any retrospective conversion project, the databases, are going to be an asset, libraries need to give exceptional consideration to the quality of the records during the conversion process. To this effect, some guidelines need to be drawn up in order to help achieve consistency and uniformity. *Retrospective Conversion: Guidelines for Libraries* written by the OCLC gives general guidelines that can be translated to one's local situations.

As pre-conversion preparation, in June and July 1995, the TML conducted a complete inventory of its collection. Among other obvious reasons, the main reason was to prepare

and update the library's records - the public catalogue and official shelf lists - for retrospective conversion that was in the pipeline. The inventory was necessary in order not to convert those records representing missing or lost books that were no longer in the collection, to ensure that the books were physically on shelves or on loan, and to check if the books were in good physical condition. Obviously, this would enable the library create a more accurate online catalogue and consequently saving search time of its patrons and minimising the retrospective conversion costs. When a book was not found, and could not be located, its record had to be withdrawn until it was either located or re-ordered. Shelf lists were prepared for books that did not have corresponding records.

The library made a tremendous effort to weed some of its materials that were no longer in use, although this was a difficult task for the library as it was practically impossible to seek the opinions of all patrons regarding the materials in question. The library cautiously excluded from converting the records of books that were not circulated at least once for the last five years, and books that were physically damaged and in unusable condition. In addition to the weeding, during the preparation for the recon project, there were other issues on which the library took decisions.

Firstly, due to limited fund, a decision was made to have a cut-off point for the project regarding materials that would have to be converted first. The library used the date of publication as a criterion. It was decided that only the records of post-1975 books should be converted to machine-readable format as most of these books were in circulation. However, records were to be manually created for the pre-1975 books that would be demanded by users.

Secondly, the use of standard MARC (Machine Readable Cataloguing) format was a necessary condition for the library to facilitate cooperation with other libraries and to benefit from widely available bibliographic utilities, especially SABINET (South African Bibliographic NETwork). It was, therefore, decided to adopt SAMARC (South African Machine Readable Cataloguing) format, which is the South African MARC and the de facto format used by most libraries in the region at that time. The library was going to outsource the retrospective conversion to SABINET whose bibliographic databases were standardised according to SAMARC and it also supported in the conversion of USMARC (United States Machine Readable Cataloguing) records to SAMARC, in particular, records acquired from OCLC through SABINET.

Lastly, it was decided to create only one record for a multi-volume set and assign unique barcodes to individual volumes instead of creating separate records for each volume or records for both the set and individual volumes.

Retrospective Conversion at NUL Library System

In July 1996, the University library system began a retrospective conversion project to automate its card catalogues representing its collection, largely of the library at the Roma campus. As has been mentioned above, the main purpose of the retrospective conversion project was to computerise the housekeeping routines and services of the library system such as acquisitions, cataloguing, circulation, serials control, and online catalogue. Hence, automation of the card catalogue and allocation of barcode labels to each library item were necessary preconditions. A recommendation was made in the feasibility study reports that the library shelf list records should be matched against SABINET and OCLC databases and those matching records be extracted and downloaded to the library system. Besides, it was recommended that the Library should manually transcribe non-hit records and records of local publications in-house by hiring temporary clerical staff. Accordingly, the retrospective conversion of the library records was executed in two ways - by outsourcing to SABINET and by inputting records in-house by library personnel. The funds for the conversion were largely obtained from external sources through the Computer Services Unit (CSU) of the University and from the library budget.

Part of the first step in the outsourcing process was to divide the shelf list records into two categories: those with ISSN or ISBN to be outsourced and those without to be converted in-house. These numbers are unique and provide closer matches between the resource file, which is SABINET database, and the shelf list records. The library records that contained ISBNs, ISSNs, and local holdings (call numbers and accession numbers) were typed into a Microsoft Word document in a prescribed format and sent to SABINET in batches. Then SABINET matched the records against its databases and holdings information was added to each record. Then the matching records were extracted and forwarded to the library. The inclusion of local holdings made the bibliographic records more complete when they were received. Finally, the records were loaded into the Stylis library system. The hit rate for the library records was about 80%, which was quite satisfactory.

The costs of retrospective conversion outsourced to vendors included purchase of matching records, price of floppy diskettes and tapes, handling fees based on the number of hours, conversion fees of records from USMARC to SAMARC and vice versa, printed list of non-hits, and courier.

When compared to in-house conversion, outsourcing was found much more reliable, faster and cost effective. A due consideration was also given to time, quality of records and staffing situation of the library system. Moreover, SABINET has been a dominant source of bibliographic records and there have been many success stories about it in the region regarding retrospective conversion. The University library has been outsourcing a backlog of cataloguing and newly acquired materials to SABINET. Similarly, the unconverted card catalogues representing materials of the branch libraries will be converted using the same methods as soon as funds are available. Currently, the branch libraries are preparing their records for conversion.

As has been mentioned earlier, the library decided to use in-house data conversion for the non-hit records (titles of no match to SABINET databases), local publications, mainly archival collection, and materials without ISSN or ISBN, though this option was eventually found to be more expensive, labour intensive, and time consuming. Six temporary data input personnel with adequate computer skills were hired for a period of 17 months to carry out in-house conversion. This was accomplished by manually keying bibliographic records from the shelf lists, card catalogue, and sometimes directly from library materials themselves into the Styliis system. Before commencing the data input tasks, they were adequately trained on SAMARC format and the Styliis system, primarily, on the cataloguing module. Lack of consistency and typographical errors were the main problems encountered with the in-house conversion option, whereas slight tagging errors were the problems with the outsourcing option.

Consequently, verification and editing of bibliographic records were necessary for both the SABINET and locally created records. These included addition and verification of local holdings (call numbers) and adapting headings, fixing typographical and tagging errors that would affect retrieval of records. The chief cataloguers did the adaptations of the records, as quality control of bibliographic records was their responsibility.

As part of the retrospective conversion project, allocation of barcode labels to each and every item was another major task to be performed after having completed bibliographic data conversion. Bar-coding is the process by which a barcode label, which is a unique

identifier that links a specific item to the bibliographic records that describes it, is attached to an item in the collection. The barcodes are usually linked to an item when they are placed on it and scanned into the automated system. They are customarily placed on the verso-title page of an item. The data entry personnel largely did bar-coding as well. The circulation module was not implemented for sometime after the purchase of the system, as the allocation of barcode labels to the majority of the library items was the necessary prerequisite.

Using due date slip, books circulated at least once since 1995 were taken as the cut-off point for the bar-coding. For the rest of the collection, barcode labels were assigned at the circulation desk when they were being checked out though it appeared to have created some inconvenience to the patrons at the beginning due to the delay.

Statistically, over 96,238 records of the university library system were converted between July 1996 and December 2000. Of these, 66,578 (69%) were converted by SABINET and OCLC, and 29,660 (31%) were converted locally. All books circulated at least once since 1995 have been given barcode labels. Most of the branch libraries' collections are yet to be converted and preparations are under way.

The Library has been creating machine-readable cataloguing records for newly acquired materials since 1997 through outsourcing to SABINET as well as keying bibliographic records directly into the library system. However, after the acquisitions subsystem has been fully implemented, retrospective conversion is no longer a problem for the library as brief records are always created by the acquisitions section when the books are ordered, and barcode labels are allocated when they are received. Eventually, the cataloguers simply enter the rest of the bibliographic information and do the necessary editing. As far as the whole recon project is concerned, about 90% of the university libraries' collection has been completed to date.

Conclusion

Retrospective conversion, which is inevitable as long as library automation is concerned, has been an intense, costly and time-consuming exercise despite the fact that it can be outsourced to vendors. By and large, conversion costs take the lion share of the total costs of a library automation project.

The retrospective conversion project carried out at the National University of Lesotho Library from July 1996 until December 2000 was in actual fact a success. Seventy per cent of the total bibliographic records of the online catalogue representing the library materials were purchased from the SABINET and OCLC while the rest were keyed straight into the local system by the library staff. Records of the post-1975 books with ISSN/ISBN were outsourced and the rest were done in-house. Those records purchased from the SABINET and OCLC were of better quality and more compliant with MARC format than those records created in-house.

However, the whole project was not without some hitches. Firstly, funds that were made available from external sources were limited and spread over a few years. As a result the project took several years and the implementation of circulation subsystem was delayed.

Secondly, staff movement resulted in a severe backlog of books to be catalogued, and were eventually outsourced to SABINET. Finally, duplicate, inconsistent, erratic entries of the authority control was another problem that emerged from the recon. This required the staff to verify and clean up the authority control files.

At present, about 90% of the bibliographic records representing the library's collection have been in machine-readable format, and all housekeeping functions at the main library have been fully operational, including the library Online Public Access Catalogue (OPAC) running in parallel with the card catalogue since August 1997. Preparations are currently under way to make it accessible outside the library buildings through the campus-wide network. As stipulated in the information strategic plan of the library, the OPAC will also be accessible over the Internet on the library web site once the rest of the records are converted.

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- * Kebede Hundie is the Systems Librarian at the Thomas Mofolo Library, National University of Lesotho. He attended Addis Ababa University, Addis Ababa, Ethiopia. He holds a Bachelors degree in Library Science and Computer Science and Master's degree in Information Science.



KEBEDE HUNDIE

SHORT COMMUNICATION

The Challenges of Computerising University of Ibadan Library Services, Nigeria

A. Oyemakinde and E. B. Ajala

*Kenneth Dike Library,
University of Ibadan,
Ibadan, Nigeria.*

Abstract

This paper discusses attempts at computerising the University of Ibadan Library Services, Nigeria. The procedure began in 1975 but owing to many constraints and errors, the library is yet to be fully automated. With persistence, it is expected that full automation of the library services will be achieved in the near future.

Introduction

In order to run an efficient and effective library system, the Library started automating some of its operations when it started with the computerisation of its serials holdings. Established in 1948 (then known as University College Library), it progressively expanded into a large library system consisting of the main library (now known as Kenneth Dike Library), Olatunde Odeku Medical Library situated at the University College Hospital and twelve faculty and other departmental libraries and reading rooms. The Library provides services to about 3,420 registered patrons per academic year and on an average of 2,000 patrons daily. Its stock, which is now approximately 590,000 volumes and which increases through new acquisitions by about 3,000 volumes or about 2,000 titles yearly, is becoming unmanageable with manual systems, particularly as there is difficulty with personnel turnover.

According to Rosenberg (1997), the use of information technology (IT) in African university libraries was a novelty, and the use of telecommunications for information access was virtually unheard of. But nowadays, the use of personal computers and CD-ROM, for developing local databases and for literature searching, is common. Libraries now use e-mail for international linkage, the use of network now features in their operations and some libraries are embarking on retrospective conversion of their card

catalogues to machine-readable form while a number of them are now hooked to the Internet. Many university libraries in Africa are now at varying stages of computerisation.

The purpose of this paper is to review ongoing efforts at computerisation of library services at the University of Ibadan.

The Challenges of Computerisation

Serials Catalogue

The Library's first experience with automation was in the computerisation of its serials catalogue. The project started in 1973. The program was written by members of staff of the University Computing Centre. The Library, which now subscribes to over 5,370 current journals and other serials, then prepared 46,000 entries including cross-references for coding. The information on a serials holding provided by the computerised catalogue included information on title, subject, holding, periodicity, location, call mark, place of publication, method of acquisition, price and agent.

The Library Catalogue

The University Library decided to use the Library of Congress (LC) Classification scheme as from 10th January 1975. Hitherto, it had used the Bliss Classification scheme and found it not quite flexible. By the time the Library changed to LC, it had concluded a contract with an external agency, Blackwell North America (BNA), to carry out a reclassification of its stock. The company had a database of Library of Congress records in machine-readable cataloguing (MARC) format. The database had some 6,000,000 items. The company filmed the University of Ibadan Library shelf-list, which it searched against the database. However, the contract with the company lapsed for lack of funds. Subsequently, the Automation Progress Monitoring Committee of the Library decided that a retrospective conversion committee should be formed to coordinate the reconversion project. This committee was established to coordinate the project that was then to be handled by two local vendors. The Reconversion Committee started to function in July 1997 and Busicon Nigeria Limited and Expert-Edge Software Systems Limited were awarded the contracts to handle the conversion of the records from 1975 to 1993 to machine-readable form. The two vendors started with great enthusiasm, but only Busicon Nigeria Limited succeeded in performing. It prepared some worksheets and got

some staff members to generate the bibliographic information on the worksheets. All information was extracted from the catalogue cards and entered into the worksheets according to TINLIB (turn-key integrated soft ware) format. Many members of staff of the Library took part in generating worksheets and editing both during the first and the second phases of the contract given to Busicon. Between 12,000 and 23,000 records were converted. Although Busicon had delivered all the records on diskettes, downloading and editing had not been completed. With experiences shared with both foreign and local agents, coupled with the types of catalogues the library wanted to create, it was decided that the remaining reconversion exercise be done in-house. One of the successes of the reconversion today is the On-line Public Access Catalogue (OPAC), which is in use in the Library.

The first problem that faced all the participants in the conversion project was the lack of training on how to handle some aspects of the work. Editing of the records already entered had to stop for some time, because the upgrading of the library software had to be done. The work was prolonged because of inadequate staff. Another setback was that although Busicon had delivered all records contracted to them on diskettes, it however failed to return all worksheets. This affected the updating of the records and the use of worksheets for editing. Some of the data entered by Busicon had incomplete records. Finally, unstable electricity supply affected the project.

Networking

The automated activities are on a network with about 25 users accessing Novell 4.15 in a star topology. The network activities are being monitored and administered through the network server located at the Computer Applications Unit of the library. The library is connected to the Internet and offers some limited services to the users. The library introduced the e-mail services in November 1995. This facility was donated by the Association of African Universities (AAU).

Owing to the high cost of dial charges due to the foreign Internet service provider, the library switched over to an Ibadan based service provider, Skannet. The major constraint to e-mail services and Internet services in the Library is the unreliability of telecommunications. On many occasions, the telephone lines in the library are erratic. The cost of patronising the service is still high. Apart from e-mail services, the Library is also connected to the World Wide Web (WWW). Although the Internet access is not yet commercialised, modalities are being worked out on how it can be accessed by

everybody at a minimal cost. The Internet access is still very expensive to run by the library.

Conclusion and Recommendation

In conclusion, the computerisation of the University library has not been easy. However, in the face of all constraints and errors, university libraries in Nigeria and other African countries should not be discouraged. Rather, an examination of input practices and analysis of errors should be made to pave way for corrections and improvements. Adequate funding has to be guaranteed before a project takes off. Library automation also requires adequate staffing and regular training for all the staff in the library system. Also, regular training sessions in computer literacy should be organised for users of the library so that they will gain maximum benefit of computerisation of library processes.

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PROFESSIONAL NEWS AND EVENTS

Raseroka Elected Chairperson of IFLA

Kay Raseroka, Director of Library Services at the University of Botswana has been voted in as the President of International Federation of Library Associations and Institutions (IFLA). She becomes the first African librarian to be elected into the position. She will succeed Christine Deschamps as president in August 2003. IFLA (The International Federation of Library Associations and Institutions) is the leading international body representing the interests of library and information services and their users. It is the global voice of the library and information profession. Founded in Edinburgh, Scotland, in 1927 at an international conference, and registered in The Netherlands in 1971, it now has 1622 members in 143 countries around the world. The Royal Library, the national library of The Netherlands, in The Hague, provides the facilities for the Headquarters.

Mrs Raseroka obtained a B.Sc. degree from the University of South Africa in 1970; lower and higher diploma in librarianship from the same University in 1970 and 1972 respectively. She also obtained the Master of Arts in Library Studies from the University of London in 1978. Kay Raseroka started her career at the University of Botswana in 1969 and rose to become the University Librarian in 1981. As a result of the restructuring of the University in 1998, she became the first Director of Library Services of the University. Mrs Raseroka has been actively involved in the development of the profession in Africa, she was the Regional Representative in the Commonwealth Library Associations (COMLA) from 1986-1988; Member of the IFLA Standing Committee in 1987; and Chairperson of the Standing Conference for Eastern, Central and Southern African Librarians (SCECSAL), 1986-1988. She was previously the Chairperson of IFLA Africa, 1993-1995 and elected member of IFLA Executive Board in 1997. She was for many years the Chairperson of Botswana Library Association. We are very proud of Mrs Raseroka and all her able lieutenants who ensured her success.

Also, the Chairperson of the Library and Information Association of South Africa, Ellen Tise was elected into the IFLA Governing Board.

Ghana Library School Changes Name

The Department of Library and Archival Studies, University of Ghana has changed its name to the Department of Information Studies with effect from 2001. The Department, which was established in 1961, offers both undergraduate and postgraduate programmes in library, archival and information studies.

A New Library Extension for the University of Botswana

The University of Botswana Library moved to its new extension on the 22nd of May 2001. The new library building is a four-storey brick structure. It has 21 seminar rooms, a 60-seat capacity conference facility and several carrels for postgraduate students. The new extension consists of 200 computer workstations, which provide access to OPAC, CD-ROM databases and Internet research information. The library is said to be the most modern in Africa in terms of facilities.

Information Research Watch International (IRWI) replaces Current Research in Library and Information Science (CRLIS)

The new product, IRWI is expected to provide latest issues and advice on LIS research. It will be published six times a year and will provide about 500 project entries per year, which will enable the professional community to know ongoing LIS research project worldwide. This product is published by Bowker, UK.

FORTHCOMING CONFERENCE

April 17-20, 2002, Pretoria, South Africa. 15th Standing Conference for Eastern, Central and Southern African Librarians (SCECSAL).

The Library and Information Association of South Africa will host the conference. The theme is: From Africa to the World The Globalisation of Indigenous Knowledge Systems. For further information contact: Retha Snyman, SCECSAL Conference Secretariat, P.O. Box 1598 Pretoria, 0001, South Africa or Email: scecsal@liasa.org.za.

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AIMS AND SCOPE

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

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Three copies of the manuscripts typed double space on one side should be submitted. Ample margins should be provided. The title, author's name, position and place of work should appear on the first page. Subsequent pages of not more than 15, should include an informative abstract of not more than 100 words. Manuscript will be considered only if it has not been published elsewhere.

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Mazikana, P.C. (1987) "Archives and Oral History: Overwhelming Lack of Resources" *Information Development*, 3 (1) 13 – 16.

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

References to contributors in collected works should be in the following order: author(s), date, title of contribution, name of the editor, title of the collected works, place of publication, publisher and inclusive pagination e.g.

Neill, J. R. and Kotei, S. I. A. (1981) "Towards a National Information System for Botswana" in Inganji, Francis (ed.) *Use of Information and Documentation for Planning and Decision Making*. Gaborone : NIR, pp. 36 – 53.

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