Information Resource Preference of Postgraduate Students at Sokoine University of Agriculture: A Citation Analysis

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Abstract

A study was conducted to understand the nature of information resources used by postgraduate students in the course of their research at Sokoine University of Agriculture (SUA) in Tanzania. This was achieved through a citation analysis of master dissertations and doctoral theses that were deposited at Sokoine National Agricultural Library between 2002 and 2012. Specifically, the study identified the type and form of information resources cited by postgraduate students, established the obsolescence of the literature cited, and examined the students' preference for e-resources. A total of 118 master degree dissertations and 74 doctoral theses were included in the study. Theses and dissertations were manually examined to extract citations and collect the required data, which were then analyzed using Microsoft Excel. The findings revealed that postgraduate students at SUA prefer journal articles to other resources. E-resources and e-journals in particular were poorly cited in postgraduate students' works. The findings also revealed that most cited resources were old although many cited e-resources were relatively newer. Based on these findings, it is recommended that universities should sensitize postgraduate students to use quality scholarly e-resources particularly e-journals. Libraries should take steps to overcome factors that constrain effective access and retrieval of e-resources. Emphasis should also be placed to ensure that students adhere to using correct citation methods and equipping instructors with skills to detect incorrect citations. It is important that information literacy courses are incorporated in the universities' curricula.

Keywords: Citation analysis, resource preference, postgraduate students, Sokoine University of Agriculture

Introduction

The main responsibility of university libraries is to support the information needs of their user populations by collecting, organizing, storing, and providing a variety of relevant information resources. University libraries are supposed to have dynamic collections in order

to keep abreast of the changing information needs of university students, academicians and other users. Meeting the information needs of users means that libraries must acquire relevant information resources. Meanwhile, knowing the type of information resources required by library users entails assessments of their information needs. Furthermore, identifying information resources that are required is most important for budgeting and planning. This is particularly necessary because many libraries tend to have limited financial resources. However, identifying the preferred information resources is particularly difficult when the target community is multidisciplinary. One important way to understand the required library resources is to examine the publications produced by the library users to discover the most cited materials. This can be achieved through citation analysis.

Citation analysis is a branch of bibliometrics used in examining references in publications such as journal articles, dissertations, theses, and books. A citation is a reference to a publication that shows the relationship between an old publication and a new one. Usually, academic writing requires that authors make reference to previously published works by mentioning the authors within their works (in-text citation) and giving bibliographic details in the lists of references (Jochen, 2007). Following the proliferation of web-based resources, many citation styles require authors to cite Uniform Resource Locators (URLs) as part of the bibliographic details in the lists of references. A URL is an address of the location of an electronic document. Citation analysis determines the patterns and frequency of use of various publications and can be used to examine their types, age, formats or other factors (Hoffmann and Doucette, 2012).

Citation studies help in identifying the information resources preferred by users in writing their works - the frequency of citation of particular publication reflects its level of preference. In other words, citation analysis is used to show the publications consumed in the process of producing newer publications. Citation analysis can also be used to eliminate lowly used or unused information resources (Gooden, 2001) and inform decisions on whether certain materials should be acquired, retained, moved into storage or discarded. It should be noted however that although students can access, use, and cite even those information resources that are not held in their libraries, in reality, most students often rely primarily on sources that are local or conveniently available, and their reference lists may then reflect that.

This study was conducted to assess the resource preference of postgraduate students at Sokoine University of Agriculture (SUA) in Tanzania, through citation analysis of Master dissertations and Doctoral theses that were

deposited at Sokoine National Agricultural Library (SNAL) between 2002 and 2012 in order to inform the management of SNAL regarding resources that should receive priority in their stock. The main objective of this analysis was to understand the types of information resources used by postgraduate students at SUA. Specifically, this study identified the type of information resources cited by postgraduate students; determined the frequency at which various forms of resources were cited; established the obsolescence of the literature used by postgraduates; and examined e-resource usage by postgraduate students. The ten-year period was chosen because SUA started subscribing to e-resources, particularly e-journals, in 2001. This study was important because postgraduates are bound to use several information resources in the course of their research. Consequently, their theses and dissertations provide useful bibliographic information (Barry, 1997). This study is useful for collection development in university libraries.

Literature Review

Several citation studies, which assess resource preference of postgraduate students, have been conducted over the years around the world. A number of studies (Iya, 1996; Bandhopadhyay and Nandi, 2001; Okiy, 2003) have indicated that books dominate the literature cited by students. Iya (1996) conducted a citation study of education dissertations at the University of Maiduguri in Nigeria and found that most postgraduate students used textbooks more than other forms of library materials. Okiy (2003) studied 70 postgraduate dissertations in education submitted to the Delta State University Library in Nigeria from 1992 to 2002 and found that postgraduate students used textbooks more often (60.3%) than other forms of library materials. Similarly, a citation analysis of doctoral dissertations in political science at the Burdwan University in India revealed that books (56.2%) were favourite publications followed by periodicals (20.2%) (Bandhopadhyay and Nandi, 2001). A recent citation study of 77 doctoral theses in sociology submitted to Sri Venkateswara University and Osmania University in India found that researchers referred mostly to book sources (Zafrunnisha, 2012). Some studies have attributed this trend to the fact that students think books are more appropriate and easier to consult than journals.

Conversely, many other studies indicate that journal articles are being cited more than other resources. Buttlar (1999) conducted a citation analysis of 61 library and information science dissertations and found out that journal articles. were cited more than other resources. Likewise, Gooden (2001) performed a citation analysis of dissertations in the Department of Chemistry at Ohio State University (USA) between 1996 and 2000 and established that journal articles were more heavily cited (85.8%) than monographs. In a study to determine the

use of information resources by postgraduate students in health and biomedical sciences. Swanepoel (2008) found that journals and magazines (69.5%) were most frequently cited followed by books and chapters in books (17%). Similarly, Oppenheim and Smith (2006) study found that most citations were from journals (32.6 %) followed by books (30%) and websites (24%). In another study, Olutokun and Makinde (2009) found that citations from journals alone accounted for more than half (55%) of the references, followed by citations from books (22%). Recently, Anunobi *et al.* (2012) observed that journal articles (34.12%) were the most frequently cited resources followed by conference papers (29.91%), monographs (21.06%), and other resources (14.89%) such as websites, encyclopedia and dictionaries. This is not surprising because journal articles are peer reviewed to ensure that they have scientific validity and hence, they constitute the most relevant literature for research.

Citation studies that examined how current the cited information resources were indicated mixed results. A study by Aina and Mabawonku (1997) conducted in Anglophone Africa found that majority of publications used for research were published within ten years. Kushkowski's (2003) longitudinal study of over 9100 citation from 629 masters and doctoral theses found that current resources were preferred regardless of discipline. However, a study that analyzed citations of masters theses produced between the year 2000 and 2008 in the School of Agriculture and Agricultural Technology of Federal University of Technology in Nigeria revealed that more than half of the resources cited were 20 years older than the year the theses were produced (Anunobi, 2012). In Tanzania, a citation study that involved 295 master dissertations and 21 doctoral theses submitted at SUA and 309 conference articles published between 1989 and 1999 found that agricultural scientists in the country had limited access to current journals (Dulle *et al.*, 2004).

A number of citation studies have also indicated that postgraduate students make less use of e-resources. Kushkowski's (2005) study which examined 141 print and electronic theses in the field of economics at Iowa State University and Virginia Polytechnic Institute, both in the USA, from 1997 to 2003 found that web citations constituted only 3.5%. Likewise, Olatokun and Makinde's (2009) study on citation analysis of doctoral works accepted at the Department of Animal Science, University of Ibadan in Nigeria found that web resources had the lowest citations. Another study conducted by Gadd *et al.* (2010) on citation behaviour of postgraduate students established that three quarters of all information resources cited were in print form. Obuh and Isebe (2012) noted that print sources were the most cited (71%) by library and information science researchers. At the University of Nigeria, Echezona *et al.* (2011) found that

online resources were poorly cited by postgraduates in library and information science. Another recent study of dissertations and theses at the Department of Agricultural Economics and Extension in Federal University of Technology in Nigeria had also found that resources from the web were least utilized (Fasae, 2012). In Africa, this situation has been attributed to lack of information literacy, poor internet connectivity, low awareness of the available e-resources and unreliable power supply. Nevertheless, some studies (Lee *et al.* 2008; Keat and Kaur, 2008; Xie and Joo 2009) conducted in recent years have indicated increased use of e-resources. Although availability of e-resources has increased overtime, their utilization may be affected by users' inadequate search skills.

In general, the literature review indicates mixed results as far as resource preference of postgraduate students is concerned. While some studies indicate that students prefer monographs to other information materials, most studies indicate that journal articles are frequently cited than other resources. The literature also shows that many postgraduate students tend to use relatively older information resources. In addition, e-resources are less utilized by postgraduates although some studies indicate increased utilization. Furthermore, there is scarcity of studies in Tanzania on resource preference by different user categories including postgraduate students. The present study was designed to fill this gap.

Study Area
This study was conducted at Sokoine University of Agriculture (SUA) in Morogoro, Tanzania. The university was established in 1984 by elevating the former Faculty of Agriculture, Forestry and Veterinary Science of the University of Dar es Salaam. Sokoine University of Agriculture is the second oldest public university in Tanzania, and the largest agricultural university in the country. During this study, SUA comprised of four campuses namely; the Main Campus and Solomon Mahlangu Campus in Morogoro, Olmotonyi Campus in Arusha and Mazumbai Campus in Tanga. The last two campuses are used for practical training. In terms of academic units, SUA has four faculties and seven institutes including the Sokoine National Agriculture Library (SNAL).

Sokoine National Agricultural Library serves both as a university library for SUA and a national agricultural library for Tanzania. The library has within its collection diverse printed and e-resources acquired over the years. Print resources include books, journals, theses and dissertations, research reports, newspapers and other materials. The print book collection alone is estimated to be 120,000 volumes. Available e-resources include 29 e-journal databases, 600

CD-ROM[2]'s and TEEAL[3] database with more than 320 journals in agriculture and the related sciences. The scope of the library collection is mainly agricultural sciences with emphasis on crop production, animal and veterinary sciences, forestry, environmental sciences, food science, rural development and related disciplines (SUA, 2011). The library has a computer laboratory with about 50 computers used mainly for searching e-resources.

Methods

This study employed citation analysis to determine the resource preference of masters and doctoral students at SUA. Citation analysis was carried out for dissertations and theses produced between 2002 and 2012. In the context of this study, dissertation and thesis are documents presenting the authors' research findings and submitted in support of master and doctoral degree respectively[4]. Available records showed that in total there were 1,180 dissertations and 74 theses in the library covering this ten-year period. Dissertations were stratified according to the years of publication and a 10 percent sample size was randomly drawn from each strata. However, all available doctoral theses were included in the study because they were relatively few in number. In total, 118 dissertations and 74 doctoral theses were selected (Table 1). Each thesis and dissertation was manually examined to extract citations from the reference lists, including; the types of resources cited, whether print or electronic, and the years of publication. The data were subsequently tabulated and analyzed using Microsoft Excel.

Table 1: Number of theses and dissertations drawn

Year	Masters dissertations	Doctoral theses
2002	7	3
2003	4	5
2004	8	5
2005	6	10
2006	3	5
2007	15	8
2008	15	5
2009	24	4
2010	15	11
2011	12	6
2012	9	12
Total	118	74

[2] Compact Disk – Read Only Memory
[3] The Essential Electronic Agricultural Library
[4] In some contexts, the word "thesis" is used for part of a master's degree while "dissertation" is normally applied to a doctorate

The main limitation of this study is that it covered theses and dissertations from only one institution. Hence, the cited resources might be characteristic to SUA in terms of their availability, types of subjects, information literacy skills and available internet connectivity.

Results and Discussions

The study findings indicate that a total of 9,595 citations were made in 118 master dissertations and 10,958 citations were made in 74 doctoral theses. This gives an average of 81.3 citations per dissertation and 148.1 citations per thesis. The higher average number of citations for thesis is common because doctoral students are expected to undertake detailed research work than masters students; hence making more citations. In the case of dissertations, journal articles were cited the most (32.5%) followed by other resources (21.0%) such as newspapers, newsletters, websites, encyclopaedia and dictionaries. Monographs (8.2%) and unpublished theses and dissertations (8.2%) had the lowest preference. Similarly, journal articles were cited the most (42.1%) in doctoral theses followed by other resources (22.1%). Unpublished theses and dissertations had the lowest preference being cited on at the rate of only 4.2% (Tables 2 & 3). These findings are in line with many other studies (Buttlar, 1999; Gooden, 2001; Oppenheim and Clarke, 2001; Swanepoel, 2008; Olutokun and Makinde, 2009; Annobi *et al.*, 2012) which found out that postgraduates prefer journal articles to other resources. As alluded to earlier, journals are preferred in postgraduate research since they carry research based evidence that is required to support new research.

Citation distribution for various years shows that masters dissertations produced in 2012 had the highest average citation (112.4 citations) followed by those produced in 2008 (96.9 citations), 2009 (92.1 citations) and 2010 (86.5 citations). Dissertations for other years had mean citations below the overall mean of 81.3 citations. In the case of doctoral theses, those produced in 2003 had the highest average citation of 271.4 followed by those produced in 2005 (225.5 citations) and 2004 (204.6 citations). Theses produced in 2006, 2008 and 2009 also had citations above the 148.1 average. The highest mean journal citation (total citations made to journal articles divide by the number of dissertations) was recorded for the year 2012 (49 citations) and the overall mean for journal citation was 26.4 for masters dissertations. In the case of doctoral theses, the highest mean journal citation (total citations made to journal articles divide by the number of theses) of 116 was recorded in year 2003 and the overall mean journal citation was 62.3. Unfortunately, doctoral theses produced in 2002, 2007, 2010 and 2012 had poor mean journal citations of 26.3, 37.1, 32.9 and 38.7 respectively (Tables 2 & 3).

Table 2: Distribution of citations in the masters' dissertations

Year	Journals	Monographs	Theses & dissertations	Proceedings	Technical reports	Others	Mean
2002	200	32	37	77	92	96	76.3
2003	57	25	23	47	66	69	71.8
2004	218	39	30	65	86	126	70.5
2005	114	28	24	44	54	94	59.7
2006	51	9	15	17	31	36	53
2007	269	49	70	115	143	221	57.8
2008	448	105	122	182	275	322	96.9
2009	666	80	203	289	436	537	92.1
2010	419	152	124	144	251	208	86.5
2011	236	89	69	121	170	166	70.9
2012	438	182	65	67	118	142	112.4
Total (by type)	3116 (32.5)*	790 (8.2)	782 (8.2)	1168 (12.2)	1722 (17.9)	2017 (21.0)	
Total	9,595						81.3

* Numbers in brackets indicate percentage

Table 3: Distribution of citations in the doctoral theses

Year	Journals	Monographs	Theses & dissertations	Proceedings	Technical reports	Others	Mean
2002	79	24	2	32	5	13	51.7
2003	580	82	52	267	133	243	271.4
2004	525	44	57	113	91	193	204.6
2005	1016	97	88	249	287	518	225.5
2006	349	33	39	111	130	220	176.4
2007	297	30	36	124	143	180	101.3
2008	315	61	29	123	83	178	157.8
2009	293	33	31	116	83	163	179.8
2010	362	77	52	131	144	186	86.5
2011	328	33	33	94	151	214	142.2
2012	464	53	44	142	142	319	97.0
Total (by type)	4608 (42.1)*	567 (5.2)	463 (4.2)	1502 (13.7)	1392 (12.7)	2426 (22.1)	
Total	10,958						148.1

* Numbers in brackets indicate percentage

Over three quarters (77.8%) of the cited resources in masters dissertations were in print form. Of the cited journals, only 7.9% were e-journals. Similarly, three quarters (74.5%) of the cited resources in the doctoral theses were in print form and only 6.8% of the cited journals were in electronic form (Tables 4 & 5). Other studies (Kushkowski. 2005; Olatokun and Makinde. 2009; Gadd *et al.,* 2010; Obuh and Isebe. 2012; Echezona *et al.,* 2011; Echezona *et al.,* 2011; Fasae. 2012) have also found less use of e-resources in theses and

dissertations. The findings also show that conference proceedings, technical reports and other resources had relatively larger proportions of electronic forms cited by postgraduates. For example, 60.7% of other resources cited by both master and doctoral students were in electronic form (Table 4 & 5).

These findings support those of Kushkowski (2005), Olatokun and Makinde (2009), Gadd et al. (2010), Obuh and Isebe (2012) and Fasae (2012) who found that the proportion of e-resources cited in postgraduates' works was low compared with other information sources. The low usage of e-resources has been attributed to many factors including inadequate information search skills, poor internet connectivity, low awareness of the available e-resources, and unreliable power supply (Lee et al., 2008; Keat and Kaur, 2008; Xie and Joo 2009). This is particularly true considering the fact that some of these theses and dissertations were prepared at the time when e-resources were not widespread in Tanzania. Nevertheless, it is possible that some of the cited journal articles were retrieved from CD-ROMs and were cited as print equivalents. It is also possible that some of the e-resources were cited as print equivalents mainly due to inadequate skills in using various citation styles.

This study also sought to establish how current the resources cited are in relation to the time the theses and dissertations were produced. Overall, the results presented in Table 6 and 7 revealed that more than half (56.1%) of the citations in the dissertations and over two thirds (68.6%) of the citations in doctoral theses were over 10 years of age. More than half (57.9%) and nearly three quarters (72.6%) of print citations in the masters dissertations and doctoral theses respectively aged over 10 years. This may be a result of the fact SNAL has not been subscribing to print journals for more than 10 years now. In terms of e-resources, half (50.8%) of citations in the dissertations were aged less than 10 years while 70.8% of those in doctoral theses were less than 10 years (Tables 6 & 7). Comparing the obsolescence of print and e-resources cited suggest that students should increase utilization of e-resources for a more up to date literature.

Table 4: Types of resources cited in dissertations by format

Year	Journals		Monographs		Theses & dissertations		Proceedings		Technical reports		Others	
	P	E	P	E	P	E	P	E	P	E	P	E
2002	198	2	32	0	37	0	73	4	82	10	79	17
2003	57	0	25	0	23	0	34	13	58	8	36	33
2004	190	28	39	0	29	1	41	24	52	34	52	74
2005	108	6	28	0	24	0	29	15	32	22	28	66
2006	42	9	9	0	15	0	12	5	20	11	14	22
2007	266	3	49	0	70	0	79	36	86	57	59	162
2008	378	70	104	1	111	11	134	48	189	86	130	192
2009	567	99	74	6	191	12	224	65	308	128	205	332
2010	415	4	142	10	123	1	137	7	226	25	95	113
2011	232	4	88	1	66	3	121	0	161	9	44	122
2012	417	21	182	0	63	2	67	0	112	6	50	92
Total (by format)	2870 (92.1)	246 (7.9)*	772 (97.7)	18 (2.3)	752 (96.2)	30 (3.8)	951 (81.4)	217 (18.6)	1326 (77)	396 (23)	792 (39.3)	1225 (60.7)

* Numbers in brackets indicate percentage

Table 5: Types of resources cited in theses by format

Years	Journals		Monographs		Theses & dissertations		Proceedings		Technical reports		Others	
	P	E	P	E	P	E	P	E	P	E	P	E
2002	79	0	24	0	2	0	32	0	5	0	8	5
2003	561	19	82	0	52	0	261	6	129	4	164	78
2004	472	53	44	0	57	0	97	16	65	26	91	102
2005	969	47	95	2	87	1	156	93	136	151	156	362
2006	339	10	33	0	33	6	75	36	81	49	97	123
2007	280	17	30	0	33	3	61	63	61	82	50	130
2008	289	26	59	2	29	0	112	11	51	32	79	99
2009	278	15	33	0	31	0	65	51	36	47	51	112
2010	308	54	77	0	52	0	81	50	76	68	44	142
2011	315	13	33	0	33	0	34	60	63	88	37	177
2012	404	60	53	0	44	0	118	24	108	34	177	142
Total (by format)	4294 (93.2)	314 (6.8)*	563 (99.99)	4 (0.01)	453 (97.8)	10 (2.2)	1092 (72.7)	410 (27.3)	811 (58.3)	581 (41.7)	954 (39.3)	1472 (60.7)

* Numbers in brackets indicate percentage

Table 6: Age distributions of citations in dissertations by format

Age (years)	Journals		Monograph		Theses & dissert		Proceeding		Reports		Others		Total (by format)		Total
	P	E	P	E	P	E	P	E	P	E	P	E	P	E	
1 - 5	484	36	84	3	124	4	133	17	171	52	95	254	1091 (14.7)	366 (25.1)*	1,457 (15.2)*
6 - 10	845	67	147	6	230	13	233	64	411	131	171	425	2037 (27.4)	706 (25.7)	2,743 (28.6)
11 - 15	686	69	173	4	203	7	260	82	318	130	210	294	1850 (24.9)	586 (24.1)	2,436 (25.4)
16 - 20	507	54	231	2	130	6	187	46	250	82	200	183	1505 (20.3)	373 (19.9)	1,879 (19.6)
21 and above	357	11	137	3	61	4	128	18	141	36	125	60	949 (12.8)	132 (12.2)	1,081 (11.2)

* Numbers in brackets indicate percentage

Table 7: Age distribution of citations in theses by format

Age (years)	Journal		Monograph		Theses & diss		Proceeding		Reports		Others		Total (by format)		Total
	P	E	P	E	P	E	P	E	P	E	P	E	P	E	
1 - 5	343	54	12	0	30	2	62	54	65	31	82	161	594 (7.4)	302 (33.7)*	896 (8.1)*
6 - 10	821	95	77	0	94	4	240	106	163	150	220	597	1615 (20.0)	952 (37.1)	2,567 (23.3)
11 - 15	1374	94	144	1	146	7	287	138	208	179	188	354	2347 (29.1)	773 (24.8)	3,120 (28.5)
16 - 20	1060	71	167	2	115	0	271	105	233	141	226	275	2072 (25.7)	594 (22.3)	2,666 (24.3)
21 and above	684	12	163	1	64	1	218	21	117	105	194	129	1440 (17.8)	269 (15.7)	1,709 (15.8)

* Numbers in brackets indicate percentage

Conclusion and Recommendations

The study findings have shown that postgraduate students at SUA whose dissertations and theses were analyzed appear to cite journal articles more frequently than other materials. However, some theses and dissertations had relatively fewer journal citations. The study also revealed that e-resources were poorly cited in postgraduate works and citations to e-journals were even less. Generally, these findings paint a picture that there is poor utilization of e-resources by postgraduates at SUA; a situation attributed to low awareness, inadequate information search skills, slow internet connectivity, and unreliable power supply, as also established by other researchers (Lee *et al.*, 2008; Keat and Kaur, 2008; Xie and Joo 2009). Nonetheless, there is a possibility that some of the e-resources were cited as print equivalents despite the fact that University guidelines require to include URL whenever citing e-resources. This may largely be due lack of skills on the use of various citation styles. The findings also revealed that most cited resources were generally old although many e-resources that were cited were relatively newer than print resources.

Based on these findings, it is recommended that universities should sensitize postgraduates to make use of quality scholarly e-resources particularly e-journals. Libraries should make efforts to overcome factors that constrain effective access and retrieval of e-resources. Emphasis should also be placed on adhering to correct citation methods. This entails incorporating information literacy courses in the universities' curricula. It is also necessary to equip instructors with the right skills to detect incorrect citations. As pointed out earlier, the main limitation of this study is that it covered theses and dissertations from only one institution. Future research may use citation analysis to assess to postgraduates' resource preference for different fields of study in order to understand specific subject preference.

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