Relevance of library collections for doctoral research: A citation analysis of theses in the field of Education and Physical Education at University of Mysore

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Abstract

The present study has been undertaken to examine the relevance of Mysore University Library collections for doctoral research in the Faculty of Educatin. The study evaluated 1865 references found in the 20 theses submitted to the University during the period from 1964 to 2013. The study includes the analysis of various variables of the citation such as type, authorship, age and library holdings to meet objectivities of the study. The findings of the study reveals that the overall average number of citations per doctoral thesis in the faculty of Education was 154.24. The researchers cited 43.97% Journals and 41.34% Textbooks in the theses. The result clearly shows that the majority of cited resources (69.44%) were Single author works found in theses. The researchers cited the majority of resources that belong to age group of less than 1 year to 10 years that constituting 733 (39.91%). The Mysore University Library owned 49.78% of 1836 resources cited in the theses. The library ownership of cited resources is varied from one type to another type of resources. The library owned 612(74.63%) of 820 cited Journals and owned 265(34.77%) of 771 cited Textbooks.The age wise availability of cited materials is varying from one decade to another

decade. The cited resources that belong to age group of 'less than 1 year' and '41 to 50 years' were available more than 65 % each in the library.

Keywords: *Citation analysis, Bibliometrics, Library collection, Collection Management, Doctoral Thesis, References*

Introduction

The relevance of library collections has become very important in the terms of the financial crunch of libraries and use of information through other communication channels such as the Internet. Traditionally, libraries were the major means of a way to find and access information, of late Internet, has provided the space for easy access to information. Today there are 2405 million of library users across the world (Internet World Stats, 2012). In India, there are 87.1 million Internet users (Internet and Mobile Association of India, 2012). This number will be increasing as Internet penetration reaches the remote parts of India. The visibility of libraries has become important in this context. Thus there is need to study how libraries are important for research and scholarship in a networked society, where an instant connection with people and institutions has become a norm. The escalating cost of e-journals, which is the offshoot of Internet technologies, has also made libraries and librarians more careful in using library budget. In order to determine the way users access information and kind of library materials users use, libraries and academicians involved in research activities have conducted both the qualitative and quantitative studies to identify the user information needs as well as the kind of materials used by the users. These kinds of studies have got the prominence as libraries started examine the usage of library collections in terms of return on investment (ROI). The study is not examining the quality of the collections available in the Mysore University Library rather examining the kind of documents cited in doctoral theses and how these collections contribute to the successful completion of the research in the Faculty of Education during the period from 1964 to 2013. The main objectives of the study is to identify the range of resources cited in the theses, to find out the type of resources cited by the researchers, to identify the authorship pattern of the researchers, to examine the age wise distribution of cited resources, to determine library ownership of the resources cited and to examine age wise library ownership of the cited resources in the library.

Literature Review

The researcher has attempted to investigate the availability of previous literature in the field of library collection contributions and reviewed that literature which is already done in the field. Similarly, Iivonen, Nygrén, Valtari, & Heikkilä, (2009) compared holdings of general as well as special universities of economic and administration discipline and reported that both universities owned nearly 80% of cited materials of research scholars' theses but owned only 10% of the print form of cited articles The faculties of anthropology used 72 % of their cited references of publications from the library collection (Kayongo & Helm, 2009). Salisbury & Smith (2010) examined that the facilities of Agricultural sciences, physical science, biological sciences, engineering have cited 73% of journal articles in their publications. Sinn (2005) stated that mathematics and statistics students were found to use their journal literature less frequently than highly research oriented fields like chemistry and biology and more frequently than applied fields like engineering and computer science. Brazzeal and Flower (2005) revealed that researcher of forestry cited only 1.8 % electronic resources. There are some studies which conducted user studies along with citation study to accurately evaluate library collection. One of the investigations conducted by Fuchs, Thomsen, Bias, & Davis (2006) who reported 55.8% of research scholar of civil engineering and education psychology accessed on third research materials electronically and 79.1% of research scholars used Inter Library Loan Services for their research work.Tourism is one of an interdisciplinary field which highly preferred to cite the 20-year-old literature (Dilevko & Dali, 2004). Singh and Chander (2016) conducted a study on publication output of Indian Journal of Traditional Knowledge and identified that majority of the articles produced by universities and majority of the papers were contributed by two authors. Keat and Kaur (2008) investigated that research scholars of library and information science subject cited publications belongs to the English language and identified that journals and books are still the most used sources for information and there is a steady increase in the use of electronic media by Library and Information Science (LIS) researchers.

Methodology

The aim of the study is to examine the relevance of Mysore University Library collections for doctoral research in the Faculty of Education. The Faculty Education includes the two subject: 'Education' and 'Physical Education'. The study conducted using the research method of citation analysis and the data source for the study was1862 references cited in the 20 theses submitted to the University of Mysore during the period between 1964 to 2013. The stratified random sampling method was employed for selecting 20 theses from 5 decades for the study. The researchers analyzed various variables of the citation to meet objectivities of the study such as type, authorship, age, and library holdings. The website citation was included for analysis of Range and Type only. The library ownership of the documents determined by using the traditional and online catalogues. The data so collected has been analyzed and interpreted in the succeeding sections of the paper.

Data Analysis and Interpretation

Cited Resources in the Doctoral Theses

Table 1 reveals the range of resources cited in the doctoral theses in the field of 'Education' and 'Physical Education'. It may be seen from the table that in all 1865 citations, the overall average number of refernces per thesis in the both Education and Physical Education subject was 154.27. The 'Education' has the highest number of average cited references per thesis constituting accounting 92.27% followed by 'Physical Education' with the average of 57 cited references. It may be noted that the Education includes the highest and lowest number of references accounting for 203 and 18 cited resources respectively

Table 1: Cited resources in the doctoral theses

Subject	Number of Thesis	Total References	Average Number of References	Lowest Number of References in a Thesis	Highest Number of References in a Thesis
Education	18	1751	97.27	18	**203**
Physical Education	2	114	57	40	**74**
TOTAL	**20**	**1865**	**154.27**	**58**	**277**

Genre of Resources Cited in the Theses

The genre of resources cited in the theses during the period from 1964 to 2013 was presented in Table 2. The research scholar of the faculty of Education cited twelve types of documents cited in the theses during the period. There has been increased in dependency on various types of resources from 2 types in the first decade to 10 types in the fifth decade. Out of 1865 cited resources, the researchers cited the highest number of Journal in the theses that constituting 820(43.97). Journal was not only predominant in total average but also it was dominated from the second to the fifth decade. However, the dependency on Journals has been increased from 34.51% in the second decade to 40.11% in the fifth decade. The similar studies also reveal that the Journal was major type of cited resources. Haycock (2004) who identified that 44% journal articles were cited in the education dissertation at University of Minnesota. The textbook was next preferred type of the cited resources by the researcher that accounting 771 (41.34%). Except for the first decade, the Textbook was the second majority of cited resources in each decade. However, the reliance on the Textbook has been decreased from 88.89% in the first decade to 38.16% in the fifth decade. It may be seen from Table that the researchers cite about 5% of reference sources that including Dictionary, Encyclopedia, and Report. Thesis and Report were the next preferred type of cited resources by the researchers that constituting 6.01% and 3.91% respectively followed by Dissertation (1.55%) and Website (1.55%). The researchers cited very least (below 1%) of some type of cited resources such as Encyclopedia (0.70%), Dictionary (0.48%), Newsletter (0.21%), Newspaper (0.16%) and Conference Proceedings (0.11%)

Table 2: Genre of Resources Cited in the Theses

	Decades											
	1964-1973		1974-1983		1984-1993		1994-2003		2004-2013		All Total (1964-2013)	
Number of Thesis	1		3		3		5		8		20	
Type	Total Citations	%	Total Citations	%	Total Citations	%	Total Citations	%	Total Citations	%	Total Citations	%
Journal			117	34.51	139	48.43	276	54.87	288	40.11	**820**	**43.97**
Textbook	16	88.89	184	54.28	117	40.77	180	35.79	274	38.16	771	41.34
Thesis	-	-	10	2.95	9	3.14	26	5.17	67	9.33	**112**	**6.01**
Report	2	11.11	24	7.08	3	1.05	13	2.58	31	4.32	**73**	**3.91**
Dissertation	-	-			13	4.53			16	2.23	**29**	**1.55**
Website	-	-							29	4.04	**29**	**1.55**
Encyclopedia	-	-	3	0.88	2	0.70			8	1.11	**13**	**0.70**
Dictionary	-	-	1	0.29	2	0.70	4	0.80	2	0.28	**9**	**0.48**
News letter					2	0.70	1	0.20	1	0.14	**4**	**0.21**
Newspaper							3	0.60			**3**	**0.16**
Conference Proceedings									2	0.28	**2**	**0.11**
TOTAL	**18**	**100.00**	**339**	**100.00**	**287**	**100.00**	**503**	**100.00**	**718**	**100.00**	**1865**	**100.00**

Authorship Pattern of Resources Cited in the Theses

Authorship Pattern of cited resources found in the theses of the faculty of Education during 1964 to 2013 is shown in Table 3. In Table, the type 'Website' was not considered for the analysis. Hence, the total 1836 cited resources were examined for ascertaining the authorship pattern. During the all five decades, out of 1836 cited resources the researchers cited the highest number of Single authored resources that constituting 1275(69.44%). The cited resources of Single authorship were not only dominated in total average but also it was dominated in each decade. However, the researchers relied on the Single authored resources have been decreased from 77.78% in the first decade to 66.91% in the fifth decade. It may be seen from Table that the researchers cited 498(27.13) resources of Collaborative Authorship. In Collaborative authorship, the Joint authored resources most cited authorship pattern that accounting 317(17.27%) followed by 'Four and more four authorship' with 100(5.45%) and 'Three authorship' with 81(4.41%). It may be noted in Table that the cited resources Collaborative authorship have been increased from 11.11% in the first decade to 30.81% in the fifth decade. Among the Collaborative, authorship the Joint authorship has been predominant in each decade and the Joint authorship has been double increased from 11.11% in the first decade to 20.28% in the fifth decade. The researchers cited only 63(3.43%) resources belong to Corporative authorship in total average. The relied on the resources that belong to Corporative authorship pattern has been drastically decreased from 11.11% in the first decade to 2.90% in the fifth decade.

Table 3: Authorship Pattern of Resources Cited in the Theses

	Decades											
	1964-1973		1974-1983		1984-1993		1994-2003		2004-2013		All Total (1964-2013)	
Number of Thesis	1		3		3		5		8		20	
Authorship	Total Citations	%	Total Citations	%	Total Citations	%	Total Citations	%	Total Citations	%	Total Citations	%
Single Authors	14	77.78	238	70.21	216	75.26	346	68.79	461	66.91	**1275**	**69.44**
Joint Authors	2	11.11	52	15.34	48	16.72	102	20.28	113	16.40	**317**	**17.27**
Three Authors			5	1.47	10	3.48	23	4.57	43	6.24	**81**	**4.41**
Four and More than Four Authors			14	4.13	4	1.39	30	5.96	52	7.55	**100**	**5.45**
Corporate authors	2	11.11	30	8.85	9	3.14	2	0.40	20	2.90	**63**	**3.43**
TOTAL	**18**	100.00	**339**	100.00	**287**	100.00	**503**	100.00	**689**	100.00	**1836**	**100.00**

Age of Cited Resources in the Theses

Table 4 reveals that Age wise distribution of cited resources found in the doctoral theses of the Faculty of Education during the period 1964 to 2013. In Table, the type 'Website' was excluded from the analysis. The citation age refers to the number of years between the completion year of the doctoral theses and the publication year of the cited resources. The citation age refers to the number of years between the publication year of the cited resources and the completed year of the doctoral theses (Smith, 2003). The citation age is calculated by finding the difference between the 'year of submission' of the thesis in which resource was cited and 'year of publication' of a resource. Mathematically it can be shown as below:

Citation age = 'Year of submission' of the thesis - 'Year of publication' of a resource

For example, if a resource published in 1962, gets a citation in the thesis which was submitted in 2002, then the citation age will be:

Citation age = 2002 – 1962 = 40 years. During the all five decades 1964 to 2013, out of 1836 cited resources, the researchers cited the majority of resources that belong to age group of less than 1 year to 10 years that constituting 733 (39.91%). This result supported by Haycock who identified that the majority of cited materials (57%) belong to the 12-year age in the education dissertation at University of Minnesota12. The second majority of cited resources belong to age group of 11 to 20 years that accounting 496(27.06%). It may be seen from the Table that more than 66% cited resources belong to the age of 20 years and around 30.3% cited resources belong to age group of 21 to 30 years. The researchers cited very least (2.72%) resources belong to the age of 51 to 200 years. It is noted that the researchers relied on age group less than 1 year to 10 years has been almost equal from the first decade to the fifth decade whereas the dependency on the age group 11 to 20 years has been increased from 11.12% in the first decade to 19.59% in the fifth decade. The researchers cited 33.34% resources that belong to age group of 21 to 50 years but it was dressed to 25.39% in the fifth decade. Similarly, the cited resources of the age group 51 to 200 years have been decreased from the first decade to the fifth decade.

Table 4: Age of Cited Resources in the Theses

	Decades											
	1964-1973		1974-1983		1984-1993		1994-2003		2004-2013		All Total (1974-2013)	
Number of Thesis	1		3		3		5		8		20	
Age	Total Citations	%	Total Citations	%	Total Citations	%	Total Citations	%	Total Citations	%	Total Citations	%
< 1 year	2	11.11	3	0.88	1	0.35		0.00	13	1.89	**19**	**1.03**
1 year	1	5.56	12	3.54		0.00	1	0.20	11	1.60	**25**	**1.36**
2 years	1	5.56	18	5.31	4	1.39	1	0.20	52	7.55	**76**	**4.14**
3 years	1	5.56	21	6.19	8	2.79	7	1.39	55	7.98	**92**	**5.01**
4 years		0.00	17	5.01	3	1.05	10	1.99	38	5.52	**68**	**3.70**
5 years	1	5.56	14	4.13	9	3.14	16	3.18	38	5.52	**78**	**4.25**
6 to 10 years	3	16.67	95	28.02	59	20.56	61	12.13	157	22.79	**375**	**20.42**
11 to 15 years	1	5.56	68	20.06	57	19.86	73	14.51	82	11.90	**281**	**15.31**
16 to 20 years	1	5.56	31	9.14	53	18.47	77	15.31	53	7.69	**215**	**11.71**
21 to 30 years	1	5.56	35	10.32	67	23.34	128	25.45	100	14.51	**331**	**18.03**
31 to 40 years	5	27.78	12	3.54	17	5.92	70	13.92	45	6.53	**149**	**8.12**
41 to 50 years	0	0.00	7	2.06	5	1.74	35	6.96	30	4.35	**77**	**4.19**
51 to 100 years	1	5.56	6	1.77	4	1.39	23	4.57	15	2.18	**49**	**2.67**
101 to 200 years		0.00		0.00		0.00	1	0.20		0.00	**1**	**0.05**
Total	**18**	**100.00**	**339**	**100.00**	**287**	**100.00**	**503**	**100.00**	**689**	**100.00**	**1836**	**100.00**

Library Ownership of Cited Resources by Type

Library ownership of the cited resource is meant here to indicate the physical or electronic availability of the resource in the library at the time of its citing by the researcher. The present study has ascertained whether or not 1836 cited resources were available – physically or electronically - in the Mysore University Library to the researcher before submission of his/her thesis. It may be noted here that if a resource is acquired by the library after the submission of the thesis by the researcher, the present study considers that the library did not own the resource at the time from the perspective of the researcher.

The percentage of availability under each type category in Table 5 is calculated with respect to the corresponding total citations in that category. For example, in 'journal' category, there are 16 cited journals of which 8 were available. Hence, the percentage of availability with respect to cited textbook is 50.00. This method of calculation is used for all data in Table 5.

During the all five decades 1964 to 2013, the library owned 914(49.18%) of 1836 cited resources found in the theses. The library owned 612(74.63%) of 820 cited Journals and owned 265(34.77%) of 771 cited Textbooks. The library held all cited Newspaper found in the theses. The library supported the researchers by providing 5(17.24%) of 29 cited Dissertation and providing 11(9.82%) of 112 cited Theses. The Reference sources cited in the theses have been partially available in the library that including Encyclopedia (61.54% of 13 cited), Dictionary (22.22% of 9 cited) and Report (10.86% of 73 cited). It is noted that the library did not own the cited Conference Proceedings and Newsletter. The results from the other studies revealed that the percentage of library ownership was more than the present study. Beile, Boote & Killingsworth (2004) made an effort to identify the availability of references of education dissertations in the institution located in the USA and reported that 91 % of cited materials available in the Institution.

Table 5: Library Ownership of Cited Resources by Type

	Decades											
	1964-1973		1974-1983		1984-1993		1994-2003		2004-2013		All Total (1974-2013)	
Number of Thesis	1		3		3		5		8		20	
Type	Total Citation	% Owned (Frequency)	Total Citation	% Owned (Frequency)	Total Citation	% Owned (Frequency)	Total Citation	% Owned (Frequency)	Total Citation	% Owned (Frequency)	Total Citation	% Owned (Frequency)
Newspaper							3	100.00 (3)			**3**	**100.00 (3)**
Journal			117	80.34 (94)	139	91.37 (127)	276	75.72 (209)	288	63.19 (182)	**820**	**74.63 (612)**
Encyclopedia			3	33.33 (1)	2	50.00 (1)			8	75.00 (6)	**13**	**61.54 (8)**
Textbook	16	50.00 (8)	184	48.36 (89)	117	25.64 (30)	180	43.33 (78)	274	21.53 (59)	**771**	**34.77 (265)**
Dictionary			1	100.00 (1)	2	50.00 (1)	4	25.00 (1)	2	0.00	**9**	**22.22 (2)**
Dissertation					13	23.08 (3)			16	12.50 (2)	**29**	**17.24 (5)**
Report	2	(1) 50.00	24	12.50 (3)	3	0.00 (0)	13	0.00 (0)	31	12.90 (4)	**73**	**10.96 (8)**
Thesis			10	10.00 (1)	9	33.33 (3)	26	7.69 (2)	67	7.46 (5)	**112**	**9.82 (11)**
Conference									2	0.00 (0)	**2**	**0.00 (0)**
News letter					2	0.00 (0)	1	0.00 (0)	1	0.00 (0)	**4**	**0.00 (0)**
TOTAL/ Average Percentage	**18**	**50.0 (9)**	**339**	**55.75 (189)**	**287**	**57.49 (165)**	**503**	**58.25 (293)**	**689**	**37.45 (258)**	**1836**	**49.78 (914)**
Note: Figure in parentheses is the frequency of owned materials and its percentage listed above it.												

Library Ownership of Cited resources by Age

Table 6 depicts that the age wise availability of cited resources found in the doctoral theses during the period of 1964 to 2013. The library owned 914 (49.78%) of 1836 cited resources found in the theses. The available cited resources belong to age span of less than 1 year to 200 years. The citation age refers to the number of years between the publication year of the cited resources and the completed year of the doctoral theses (Smith, 2003).

The percentage of availability under each age category in Table 6 is calculated with respect to the corresponding total citations in that category. For example, in the category of <1 year, there are 2 cited resources of which 1 were available. Hence, the percentage of availability with respect to cited resource is 50%. This method of calculation is used for all data in Table 6.

It may be seen from Table that the library held one resource cited in the theses that belong to age group of 101 to 200 years. It may be seen from the Table that the cited resources that belong to age group 'less than 1 year' and '41 to 50 years' were available more than 65 % each in the library. The library held each 50 to 60% cited resources of some age group that including 51 to 100 years, 1-year, 21 to 30 years and 16 to 20 years. It may be seen from the Table that the cited resources of the age group 11 to 15 years, 5 years, 31 to 40 years and 4 years were available 40 to 50% each in the library and library owned below 40% cited resources each from the age group of 3 years and 2 years.

Table 6: Library Ownership of Cited Research Materials by Age

	Decades											
Age	**1964-1973**		**1974-1983**		**1984-1993**		**1994-2003**		**2003-2013**		**All Total (1974-2013)**	
Number of Thesis	**1**		**3**		**3**		**5**		**8**		**20**	
	Total Citation	**% Owned (Frequency)**	**Total Citation**	**% Owned (Frequency)**	**Total Citation**	**% Owned (Frequency)**	**Total Citation**	**% Owned (Frequency)**	**Total Citation**	**% Owned (Frequency)**	**Total Citation**	**% Owned (Frequency)**
< 1 year	2	50.0 (1)	3	66.67 (2)	1	0.0 (0)			13	84.62 (11)	**19**	**73.68 (14)**
1 year	1	0.0 (0)	12	66.67 (8)			1	0.0 (0)	11	45.45 (5)	**25**	**52.00 (13)**
2 years	1	0.0 (0)	18	77.78 (14)	4	0.0 (0)	1	0.0 (0)	52	28.85 (15)	**76**	**38.16 (29)**
3 years	1	0.0 (0)	21	57.14 (12)	8	62.50 (5)	7	57.14 (4)	55	27.27 (15)	**92**	**39.13 (36)**
4 years	-		17	52.94 (9)	3	100.00 (3)	10	70.00 (7)	38	28.95 (11)	**68**	**44.12 (30)**
5 years	1	100.0 (1)	14	42.86 (6)	9	66.67 (6)	16	87.50 (14)	38	26.32 (10)	**78**	**47.44 (37)**
6 to 10 years	3	66.7 (2)	95	57.89 (55)	59	71.19 (42)	61	60.66 (37)	157	33.12 (52)	**375**	**50.13 (188)**
11 to 15 years	1	100.0 (1)	68	50.00 (34)	57	50.88 (29)	73	61.64 (45)	82	36.59 (30)	**281**	**49.47 (139)**
16 to 20 years	1	0.0 (0)	31	58.06 (18)	53	54.72 (29)	77	49.35 (38)	53	47.17 (25)	**215**	**51.16 (110)**
21 to 30 years	1	100.0 (1)	35	62.86 (22)	67	47.76 (32)	128	62.50 (80)	100	34.00 (34)	**331**	**51.06 (169)**
31 to 40 years	5	40.0 (2)	12	16.67 (2)	17	76.47 (13)	70	41.43 (29)	45	44.44 (20)	**149**	**44.30 (66)**
41 to 50 years	0		7	57.14 (4)	5	80.00 (4)	35	74.29 (26)	30	63.33 (19)	**77**	**68.83 (53)**
51 to 100 years	1	100.0 (1)	6	50.00 (3)	4	50.00 (2)	23	52.17 (12)	15	73.33 (11)	**49**	**59.18 (29)**
101 to 200 years							1	100.00 (1)			**1**	**100.00 (1)**
Total	**18**	**50.0 (9)**	**339**	**55.75 (189)**	**287**	**57.49 (165)**	**503**	**58.25 (293)**	**689**	**37.45 (258)**	**1836**	**49.78 (914)**
Note: Figure in parentheses is the frequency of owned materials and its percentage listed above it.												

Discussion and Conclusion

The present citation analysis study attempted to examine the relevance of Mysore University Library collections for doctoral research in the Faculty of Education. The study result identified that out of 1865 cited resources, 43.97%t were cited Journals and 41.34% were cited Textbooks. Textbook was the major type of resource cited in the theses from the first decade to the second decade and the Journal was the major type of resources cited from the third decade to fifth decade. The result clearly shows that the majority of cited resources (69.44%) were Single author works cited in theses. The researchers cited the majority of resources that belong to age group of less than 1 year to 10 years that constituting 733 (39.91%). The Mysore University Library owned 49.78% of 1836 resources cited in the theses. The library ownership of cited resources is varied from one type to another type of resources. The library owned 612(74.63%) of 820 cited Journals and owned 265(34.77%) of 771 cited Textbooks.The age wise availability of cited materials is varying from one decade to another decade. Therefore, the library should have to frame appropriate collection development policy for improving the adequate collection to fulfill needs of the doctoral researchers.

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