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Citation Analysis of Masters Theses in Electrical and Electronics Engineering Literature, Submitted to Abubakar Tafawa Balewa University Bauchi (1990-1998)

Yahya Ibrahim Harande
Department of Library and Information Sciences, Bayero University P.M.B. 3011 Kano, Nigeria
E-mail: harandeyi@yahoo.com

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Abstract **- A citation analysis was carried out taking data from 17 theses in Electrical and Electronic Engineering Submitted for the award of masters' degrees in Abubakar Tafawa Balewa University during the period of 1990-1998.A grand total of 373 citations were recorded in all the 17 theses from all kinds of literature formats. Journals and books were found to be cited heavily and more than other sources of information. Citations from journals were 43% and 40.7% from books. This finding shows clearly that journals and Books are the major sources of pertinent information for research by the Electrical and Electronic Engineers. Provision of these relevant materials in Nigerian Universities is hereby recommended for the use of the engineers in their researches.**

I.INTRODUCTION

University libraries have the sole responsibility for acquiring current published materials for use by researchers and other library users. However the exponential growth and increase in publications, their cost, space for storage, personnel and economic condition of the country have made it extremely difficult for the university libraries to acquire every needed publication .They are now faced with the problem of identifying the most useful literature for acquisition. Therefore, libraries have begun to use more scientific method in selecting and acquiring library materials. One such method is the citation analysis, a method whose results were propounded by Bradford a British Librarian.

Citation analysis could be referred as the study of pattern of literature used in a given subject field for the purpose of identifying the core literature that researchers cite most in the course of their research. Onyancha (2009) opined that "in bibliometrics, the number of research articles and citations constitute the main measurement indicators of research output and impact respectively." In another dimension, it refers to the techniques applied in analyzing the tools or materials which have been used by authors in composing the contents of their texts. Harande and Ladan (2013) observed that, "citation analysis is one of the bibliometrics research tools used in evaluating scholarly communication with the intent of finding or establishing links or relationships with various studies, researchers, scholars, institutions and corporations." This indicates the use of Information sources, both packaged and repackaged. For example, books, journals, reports, abstracting journals, indexing journals, bibliographies, theses, dissertations, projects reports, etc. However, some scholars attached citation exercises with the services rendered by a given library, i.e. LaBonte (2005) says "citation analysis is a practical tool to evaluate how a library is meeting the needs of local users." Similarly, Maharana, Majhi and Sethi (2011) opined that, "citation determines the importance and use pattern of a research work. Citations can be counted as measures of the usage and impact of the cited work." This statement clearly shows that citation analysis is an important aspect of informetrics technique which provides information on how scholarly communications are analyzed for the purpose of research. Sangwal (2013) orated that, "investigation of distribution of authors, citations and publications is an active research area in informetrics." Umar (1994) observed that, "Citation studies have been concerned primarily with the properties suggested by its bibliographic description, author, title, place and date of publication, a description which is relatively standardized." Also Brittain and Line (1973) have listed five possible sources for which references or citations can be collected. They are as follows.

1. Abstracting and indexing journals
2. National or other general bibliographies
3. Selective critical bibliographies
4. Primary publications (used directly or by means of science citation index)
5. Review journals."

For the purpose of this study, masters theses in the subject of electrical and electronics engineering formed the sources for analysis. The idea of citing other peoples work becomes the tradition of scientists, engineers, technologists, and scholars for decades. Subramanyam (1980) found that, "The act of refereeing to earlier articles by scientists means that scholarly scientific literature is always based on literature published earlier. Subramanyam (1980) reiterated further that, "acknowledgement of earlier contributions by making references to earlier writings is an established practice in written communication in science." Houghton (1975) also, suggested that, "Papers begets papers; a scientist will read and assimilate the work of his pre-cursors and peers and use their experience as a catalyst and stimulate to his own activity. Their papers will act as a platform and spring board

for his published work and they will be cited in his papers. His own will subsequently be cited by peers and heirs and so the fabric of the literature will be worked."

On the uses of citation analysis, Subramanyam (1980) suggested that, the largest number of citation studies have been concentrated on the identification of core journals in various disciplines and view it as a very useful tool in the selection of journals and other types of documents. He then concluded that citation studies are especially helpful in developing and managing collection. However on the application of citation analysis to a particular subject field, many studies were conducted. Bayers and Folyer (1966) made a correlational study between citation and productivity in science by comparing the citations received by 467 scientists earning their doctorate degrees in biochemistry in 1957 and 1958. The study shows that, three times as many graduates of high quality than low quality institutions produced papers which were cited more than fifteen times. Other studies include that of Sengupta (1974) in microbiology, pharmacology and physiology. Brace (1976) in library and information sciences. Subramanyam (1980) in science and technology etc.

Also, Okanlawon (1989) in her study on the literature used by post graduate agricultural students of Ahmadu Bello University Zaria (ABU) revealed that, postgraduate agricultural students cited periodicals (57.94%) more than monograph (18.44). Another example is that of Tijjani (1991) the study examined the literature used by the medical students and resident doctors of ABU between 1990 and 1998 and their availability in Nigerian medical libraries. The citation of periodicals was almost twice (58.56%) that of monograph (30.30%). Umar (1994) analyzed the postgraduate engineering literature cited by engineers and technologists of (ABU) and found that 927 (40.84%) of the citations were journals. Therefore, the findings of his study shows that, engineers like scientists also relied heavily on journals as their sources of information.

The main objective of this study was to find out the citation pattern of researchers in electrical and electronics engineering in relation to materials they consulted or referred to in their researches. The study also determined the most cited document by the engineers, and this will in no small measure help the engineers, scientists, researchers and technologists in their quest to satisfy their information needs; as well as the university libraries in their selection of information resources.

II.METHODOLOGY

The study is limited only to master's theses in electrical and electronics engineering submitted to the Abubakar Tafawa Balewa University, Bauchi for the period 1990-1998. Bibliographic details of the theses concerned were collected. Citations in each dissertation were collected. The data were analyzed statistically and the results are presented as Table I and II.

III.RESULTS AND DISCUSSIONS

TABLE I CITATION PATTERN OF MASTERS' THESES IN ELECTRICAL AND ELECTRONIC ENGINEERING SUBMITTED IN ATBU 1990-1998.

Year	Number of dissertation submitted	Number of citations	Average per dissertation
1990	0	0	0.0
1991	1	35	35.0
1992	2	51	25.2
1993	0	00	0.0
1994	7	118	16.8
1995	2	48	24.0
1996	0	0	0.0
1997	3	74	24.6
1998	2	47	23.5
total	17	373	22

Table I shows the distributed of these submitted for the masters' degree in electrical electronics of engineering Abubakar Tafawa Balewa University, Bauchi during the period of 1990-1998. No these were submitted in these years 1990, 1993 and 1996. The highest numbers of these were submitted in 1994(7 out of the total of 17 for the period under study). The total of 17 these were submitted during the period giving the total number of 373 of citations. The highest number of citations 35 was made to the one thesis in 1991, whiles the least number of citations 11, was made in one of theses submitted in 1994. The highest number of citations per theses is 22.

The distribution of citations of different sources of literature is given in table 2 above. Journal articles were cited a total of 160 times which is the highest (68.6per cent), followed by books which was cited a total of 152 times (40.7 per cent). Journal articles were cited most among the literature in 1991 (68.6 per cent) and the lowest in 1998 (53.1 per cent). Also books were cited most in the year 1998 (53.1 per cent) and the highest in the year 1995 (27.0 per cent). Looking closely at the nature of the distribution, it can be said that, journal articles and books were the most cited sources of information by the post graduate students of electrical and electronics engineering.

TABLE II CITATION DATA FOR THE LITERATURE CITED IN MASTERS' ELECTRICAL ELECTRONICS THESES, 1990-1998.

Formats	1990		1991		1992		1993		1994		1995		1996		1997		1998		Total	
	TC	%	TC	%	TC	%	TC	%	TC	%	TC	%	TC	%	TC	%	TC	%	TC	TP
Books	-	-	11	31	25	49	-	-	51	43	13	27	-	-	27	36	25	53	152	41
Book Chapters	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Journal Articles	-	-	24	69	24	5	-	-	54	46	31	64	-	-	17	23	10	21	160	43
Occasional Papers	-	-	-	-	-	-	-	-	3	3.0	1	2.0	-	-	13	18	3	6.0	20	5.0
Conference Papers	-	-	-	-	-	-	-	-	-	2.0	2	3.0	-	-	-	-	7	5.0	13	3.0
Reprints	-	-	-	-	1	0.8	-	-	2	2.0	-	-	-	-	-	-	-	-	3	0.8
Dissertations	-	-	-	-	-	-	-	-	2	2.0	1	2.0	-	-	4	5.0	1	2.0	8	2.0
Unpublished Materials	-	-	-	-	1	0.8	-	-	2	2.0	1	2.0	-	-	5	7.0	1	2.0	10	3.0
Reports	-	-	-	-	-	-	-	-	2	2.0	-	-	-	-	3	4.0	2	4.0	7	2.0
Total	-	-	35	100	51	100	-	-	118	100	48	100	-	-	74	100	47	100	373	100

Key - TC: Total Citation TP: Total Percentages

.IV.CONCLUSION

In conclusion, it can be said that, based on the above findings, the post graduate students of electrical and electronics engineering of Abubakar Tafawa Balewa University, relied heavily on journals and books for their research. Also both the journals and books were not consistently used by the students throughout the years of the study. This might be attributed to the possibility that most of the available journals were not current and relevant, while books were not always available. This might be because of the poor conditions of the Nigerian universities.

V.RECOMMENDATIONS

Based on the findings of the study it is recommended that, current and pertinent materials should be acquired for the use of research students of electrical and electronics engineering. Similar should be carried out in other fields. These will reveal the problems encountered by research students in these fields. However, there is need for the new breed electrical engineers to engage in learning of new skills for the conduct of research more especially now that we are in the era of information technology (IT). The citation pattern of advanced researches i.e. Masters and PhD degrees will largely depend or reflect the "Internet" as a new database that cannot be neglected. Many of the scholars were of the view that, Students and researchers need library user education to enable them embark on more useful and pertinent research work as well as make accurate citations.
Citing relevant materials from the internet opens new ways for conduct of researches and for citing the consulted literatures. Researchers in almost all human endeavors should take the advantage of the enormous volume of literature that is being imputed in to internet dataset.

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