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A scenario of the various metrics based papers published by authors in India from 2008-2017

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Scientometrics/Bibliometrics/Infometrics/webometrics, these are the term which tells about the statistical studies in a particular subject to know about the trend, development and status of the subject, organization and its personnel. It helps in decision making, setting new policies and parameters for the development of society, and also the subject in which that study has been carried out. Present study is an attempt to find out the extent of various metric studies carried out in the discipline of Library & Information Science.

Keywords: Citation Analysis, Performance Indicator, Web Impact Factor, Research Trend Analysis, H-index.

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INTRODUCTION

Authors have to publish in their area to make them visible in the academic world, to sustain their position in the academia and also to add some value to the field in which they have gained mastery. Similarly, research evaluation is done systematically to measure the advantages, use and impact of research result on the society, well-being of community or decision making and policy formulation. This evaluation of research result with the help of some performance indicator or yardsticks called metrics, originated from the Latin word *metricus*, which means a measure for something. The idea behind this metrics studies are to have a clear picture of the development of discipline, the profession and everything connected with it. When these studies of the scope, nature and various applications of several metrics is done in the field of science subjects than it is commonly known as Scientometrics. This term has many quasi synonymous terms like Bibliometrics/ Informetrics /Webometrics etc. A good number of publications are there on the topic Bibliometrics/ Scientometrics /Webometrics. There are conferences and seminars devoted to Scientometrics /Bibliometrics/ Webometrics like International Society for Scientometrics and Informetrics (ISSI) or COLLNET. Similarly there are some periodicals which are entirely devoted to this sub discipline like 'Scienometrics', COLLNET Journal of Scientometrics and Information Measurement, Journal of Scientometrics Research etc. Bibliometric studies help in carrying out the analysis of research contribution in a particular field of study. When an analysis of websites is carried out using different parameters it becomes Webometrics. In the language of Bjorneborn & Ingwersen [1] "the study of the quantitative aspects of the construction and use of information resources, structures and technologies on the web is called webometrics." It includes webpage content analysis, web link structure analysis, web page usage analysis and web technology analysis. Bibliometrics term was given by Pritchard, [2] is the application of Mathematical and Statistical methods to measure the quantitative and qualitative changes in different media. It tries to measure the contribution of authors in various collaboration, their impact on the subject, on the uses of periodicals, most prolific periodical, geographical distribution of research work and collaboration etc.

The very basis of all these studies are the three famous

laws called, Lotka's inverse square law, Bradford's Law of Scattering and Zipf's Law of Word Occurrence. Lotka observed a relation between authors and their scientific productivity. It states…."that number of authors making n contributions is about $1/n^2$ of those making one, and proportion of all contributors, that make a single contribution, is about 60%,"[3] which means that, out of all the authors in a given field, 60% will have only one publication, 15% will have two publication and 7% of the authors will have 3 publications. In other words, in a particular topic, for every 100 authors, whose contribution is single article, there will be 25 authors with two articles and 11 authors with three articles etc. General expression for Lotka's Law is $x^n.y = k$, where x represents no. of contribution and y represents no. of authors. For the special case n=2, the value of constant is 0.6079. [4]. A number of studies have been carried out to find out the productivity of authors in various dimensions, such as direct and indirect. Directly by quantitative and qualitative study of the publications produced by authors and indirectly by analyzing the impact of publications on future researches. Quantitative studies have been done by Kawamura M, Thomas CD, Tsurumoto A, Sasahara H, Kawaguchi Y., [5] on the Journal of American Dental Association, where a logarithmic graph was plotted for the number of authors against their contribution, and finding suggested that repeated publication by the authors was a rare phenomenon. Similar contribution studies were carried out by Devendra Kumar Mishra, Manisha Gawde and Madhu Singh Solanki [6] of the Ph. D thesis in English. Data was collected for different factors and analysis of the different aspects such as length of articles, Rank of guide, authorship pattern etc.. Verma, N., Tamrakar, R., & Sharma, P. [7] analyzed the journal Annals of Library & Information Studies in terms of Author productivity and concluded that majority of the journals are two authored and authors belong to New Delhi. Number of studies (Jacobs, D. 2001), (Singh, G., Mittal, R., & Ahmad, M. 2007), Thanuskodi, S. [8, 9] have been carried out to find the productivity of authors as well as their affiliations, collaboration with their peers at national as well as international level. These all studies come under direct studies.

Indirect studies are the impact studies carried out variously by Dutta, Das and Sen [10], Ming-yuesh Tsay [11], Dean Hendrix [12], Liang Zhang ET. Al. (2010), Prashant P Deshmukh [13] and Nilaranjan Barik & Puspanjali Jena [14]. These studies were based on the Citation analysis of the publications revealing Citations per article, average citations received by the articles as well as journals, Ranking of the journals and institutions, authors their collaboration and core periodicals in the field. Some studies also tried to find out the half-life of the journals as well as books in which the authors publish.

Literature is replete with these types of studies. If these metrics studies are analyzed in time course, it can be found that various parameters used for the studies have also changed with time. Like, Nour's [15] study in 1985, where he analyzed LIS research articles on the basis of parameters: journals, Research Methodology, Subject, total no of references and references to journal articles. In 1999, study by Kumpulainen [16] appeared in which parameters used were- organization context, subject topics, various activities, methods of data collection, various analytical methods etc. After 2000, focus of study changed to Trend analysis, authorship pattern, collaboration pattern, Impact Factor of journals as well as authors' h-index etc. From 2010 onwards three dimensional study came up, where quantity, quality and consistency of the publications were analyzed, besides a number of indices given by various scientists like g-index, h-index, hg-index etc. came up. This study is just an attempt to find the range of parameters that have been used in the metric studies by different authors.

OBJECTIVES

Objectives of the present study is to analyze the extent of use of various parameters by authors to carry out Bibliometric/ Scientometric/ Webometric studies. Major parameters that can be used for metric studies as given in the e-text of e-pgpathshala [17] are-

- Ranked list of journals by citations (Core Journals)
- Citation Half-life and Obsolescence
- Self-Citation
- Authorship studies
- Collaborative research
- Repetitiveness of citation and Bibliographic coupling
- Co-citation
- Subject Dispersion
- Language wise distribution

METHODOLOGY OF STUDY

Method used in the present study is an analysis of the articles with respect to their objectives, published in two major journals of Library and Information Science namely Annals of Library and Information Studies and DESIDOC Journal of Library & Information Technology from 2008 to 2017. ALIS is a quarterly publication so, there were 40 issues of ALIS. Similarly, DJLIT is a bimonthly publication so, total 60 issues of DJLIT were analyzed for the metrics based articles. Then various parameters used in the objectives of the studies were analyzed and tabulated.

There were total 86 articles based on various metrics studies in DJLIT and 56 articles in ALIS. Out of theses 86 articles of DJLIT, 25 articles contained Scientometrics words in their title i.e. were Scietometric studies, whereas, 8 studies were based on Webometrics and rest

Table 1. List of parameters used for the study

S. No.	Parameters used for studies	DJLIT	ALIS
1	Ranked list of journals by citation	20	15
2	Citation Half-life and Obsolescence	2	0
3	Self-Citation	Nil	Nil
4	Authorship studies	30	21
5	Collaborative research	35	21
6	Repetitiveness of citation and Bibliographic coupling	Nil	Nil
7	Co-citation	Nil	Nil
8	Subject Dispersion	40	15
9	Language wise distribution	5	0

Table 2. Frequently used Parameters for Bibliometric studies

S. No.	Parameters used for study	DJLIT	ALIS
1	Literature Growth	61	21
2	Authorship Pattern	30	21
3	Prolific Author	33	11
4	Prolific Institution	33	16
5	Prolific Journal	20	15
6	Geographical Distribution of Periodicals	30	18
7	Collaboration pattern	35	21
8	Citation Analysis	39	19
9	Subject area distribution	40	15
10	Preferred Communication Channel	17	7
11	Bradford's Law	7	7
12	Lotka's Law	6	4

53 belong to Bibliometrics. Of the 56 articles of ALIS, 9 articles contained Scientometrics word in their title or were Scientometric studies, 6 Webometric studies and rest 41 were Bibliometric studies.

RESULT AND DISCUSSION

The careful analysis of the objective of studies in various issues of ALIS & DJLIT revealed following result which has been represented in a table form (Table 1). The various parameters that have been used for analysis have been tabulated in the given table.

The above table (table 1) shows that Ranking of journals on the basis of Citation, Authorship studies, Collaborative research, subject Dispersion were the frequently used parameters for study whereas citation half-life and Obsolescence, Self-citation, Bibliographic coupling, Co-citation and Language wise distribution of the articles were the least used parameters.

When the frequently used parameters of Bibliometric studies were analyzed deeply and tabulated in table 2 the outcome was as follows- out of the 53 Bibliometric studies of DJLIT and 41 Bibliometric studies of ALIS, various dimensions of studies were- Trends analysis, individual scientists' Bibliometric profile, productivity of various universities & departments, comparison of productivity of one university with that of another at national or International level etc. A deep analysis of the various parameters used in the Bibliometrics studies in the articles published in the DESIDOC Journal of Library & information Science and Annals of Library & Information Studies have been tabulated in the given table no. 2. Literature growth (61), subject area distribution (40) and Collaboration pattern (35) is the most used parameter for study whereas preferred Communication channel (17), Prolific Journal (20) and Authorship pattern (30) is least used parameter in DJLIT. Similarly in ALIS, Literature Growth (21), Authorship pattern (21) and Collaboration Pattern (21) is frequently used parameter whereas preferred Communication channel (7), Prolific Author (11) and Prolific Journal as well as subject area distribution (15) is least used parameter in ALIS. Although Bradford's Law and Lotka's Law has not got their proper recognition.

CONCLUSION

After analyzing 86 articles of DJLIT and 56 articles of ALIS, it was found that, there are 6 articles each from ALIS and DJLIT on Webometrics, 39 articles from DJLIT and 19 articles from ALIS on Citation Analysis dealing with H-index, IF, CPP and RCI. None of the articles on Citation Analysis dealt with self -citation, or Half-life of citations. Only two articles of DJLIT have dealt with

Obsolescence study, which is quite useful study. Of the Bibliometric/scientometric studies, most frequently used indicators were Authorship pattern, Collaboration studies, Literature growth study, geographical distribution of publications and subject area distribution study. In the Citation analysis studies Co-citation study, Bibliographic coupling, IF analysis, Half-life studies, Obsolescence studies have been rarely used, they should be given due importance. Besides, this is the era of Digitization, so webometric analysis is the need of the time. Another important indicator for quantitative study is 3-D evaluation of information production given by Gagan Pratap. [18]. It is a simple heuristic model using 2-D, quantity (productivity in terms of number of papers published) and Quality (Specific impact as defined by citations per paper) are complemented by a third dimension, called consistency η, this enables a better 3-D evaluation of information production process. There are 3 study using this indicator in DJLIT. This study should also be given consideration.

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