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Citations of DESIDOC Journal of Library and Information Technology: Statistical Analysis of Google Scholar Based Research Impact for the Period of 2006 to 2015

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ABSTRACT

Google Scholar (GS) is the only available global database for the citation analysis of Indian LIS journals. The present study is an attempt to highlight the citation output of research articles in DESIDOC Journal of Library and Information Technology (DJLIT) published during the period 2006–2015. This study is based on Google Scholar data. Descriptive and inferential statistical techniques were applied in the study. 406 articles were published during 2006–2015, which were cited 4122 times in Google Scholar. Based on Google Scholar, this study proves that the citation output of articles published in the DJLIT differs significantly with their publication year. The level of citation is not constant throughout the study period. There is also a weak negative correlation between citations of articles and its publication year. Although, GS covers wide spectrum of scholarly literature worldwide, this study found that DJLIT journal article's visibility is decreasing in GS database.

Key Words: ***DESIDOC Journal of Library and Information Technology, Google Scholar, Indexing Services, Citation Analysis, Google Metrics, Bibliometrics, Scientometrics, Statistical Analysis***

1. Introduction

Bibliometrics and citation counting provide the quantitative indicators used to measure scholarly impact and influence of journals, authors and papers in a subject. Citations can be used as an indicator of research importance or quality. These citations can act as a tool in assessing the effectiveness of communication and express the extent to which researchers bring their work to the attention of a broad, potentially interested audience. Informetric tools

may help researchers and their organizations to demonstrate their performance. Now-a-days the use of the term informetrics reflects not only the bibliometric indicators based on publication and citation counts, but also with altmetrics, webometrics, and usage-based metrics derived from a variety of data sources. Scientific scholarly journals can also be assessed with the use of above forms of bibliometric indicators. The use of these informetric indicators enables in assessing the quality of research assessment of scholarly journals in a systematic manner. These indicators can be useful tools for authors who are interested in tracking the degree of attention to their work, and in assessing the effectiveness of their communication strategies.

Informetric indicators, including the important group of citation based measures, have become widely available in scholarly literature retrieval tools like Google Scholar. Google Scholar is one of the altmetric journal citation based indicator introduced in the year 2004. It is a free academic search engine and citation index that can be used to assess research impact. It covers a much wider variety of document types and sources than Scopus and Web of Science (Thelwall&Kousha, 2015). Google Scholar has a "cited by" feature that lists the number of times a document was cited. Google Scholar citation counts indicate the number of citations a publication has received (Agarwal et al., 2016). The indicators shown in the Google Scholar are H index and H5 index. The indicator H index for a set of articles is the largest number H so that H articles have at least H citations. H5 index is the H index for articles published in the last 5 complete years. Currently, indicators such as author *h* indices and total citations and publication counts are available in the Google Scholar database.

DESIDOC Journal of Library and InformationTechnology (DJLIT) is one of the leading Library and Information Science journals in India, being published by Defense Science Documentation Centre (DESIDOC), Defence Research and Development Organization, Government of India, New Delhi since 1981 on bimonthly basis, each volume having six issues. DJLIT is a peer reviewed journal, indexed in Library and Information Science Abstract (LISA), Library and information Science Technology Abstracts (LISTA), Indian Citation Index (ICI), Indian Science Abstracts (ISA) etc. The DJLIT is an open-access journal with high visibility and discoverability of authors and papers in Google Scholar.

2. Related Studies

Naidu (2017) in his study found that DJLIT has high visibility in Google Scholar. His study also found that during the 24 year publication period (between 1988-2015) 432 articles

were cited 4199 times in Google Scholar. Singh and Singh (2017) in their paper investigated the citation and authorship patterns of International Journal of Library and Information Studies on the basis of Google Scholar. The study found that during the five years (between 2011-2015) 20 articles were cited 118 times in Google Scholar.

Swapan Kumar(2014)in his study traced the citation and authorship patterns of selected Library and Information Science (LIS) journals. The study found that Indian LIS journals have low visibility in Google Scholar database. Since multiple authored articles got more citations than the single authored articles, the study suggested LIS researchers to increase collaboration for better visibility of their research.

FilistéaNaudé(2017) investigated the relationship between download usage statistics, Mendeley readership scores and Google Scholar citation counts. The 378 articles published in the Electronic Journal of Information Systems in Developing Countries (EJISDC) in the 14-year period 2000 to 2013 were examined. Results showed that all 378 articles were downloaded and had Mendeley readers. Of the 378 articles, 359 (94.97%) articles received Google Scholar citations and 19 (5.03%) articles received no citations. For the 359 cited articles, the average Google Scholar citations per article were 28.82. The average EJISDC downloads were 7440.69, the average Mendeley readership was 19.30 and Google Scholar citations were 27.36. For this journal, the results seem to indicate that the highest correlations (Spearman correlation coefficient) were between Google Scholar citations and downloads, a slightly lower correlation between Google Scholar citations and Mendeley readership, and the lowest correlation was between downloads and Mendeley readership.

3. Objectives

The primary objective of the study is to analyze the published year-wise analysis of articles' citations. The major objectives of the present study are: (a) to find out the year-wise published articles' citations of DESIDOC Journal of Library & Information Technology by Google Scholar in the publication period, 2006-2015; (b) to find out the year-wise published articles' level of citations of DESIDOC Journal of Library & Information Technology by Google Scholar in the publication period, 2006-2015.

4. Hypotheses

For the present study, following hypotheses are framed;

(a) Total number of year-wise published articles' citations do not differ during the period;

(b) The year-wise published articles' level of citations are not constant in the ten-year period.

(c) There exists a positive correlation between total year-wise published articles' citations and the concerned publication year.

5. Methodology

The data for the present study were collected from the Google Scholar citation web page of DJLIT available at https://scholar.google.co.in/citations?user=RFLVDYcAAAAJ&hl=en on 16/06/2018. Published year-wise articles' citations were collected and entered in an Excel sheet. The statistical analysis was done using SPSS. Since the data was not following normality and includes outlier values, inferential analysis was done by applying nonparametric methods. The nonparametric methods used for the present study are Kruskal-Wallis test, Chi-square test for independence of attributes and Spearman's Correlation.

6. Results and Analysis

6.1 Year-wise Citations of Articles

Table 1 shows the published year-wise citation of articles, the majority of the citation (842; 20.43%) was received for the articles (44; 10.8%) published in the year 2008 followed by 580 (14.07%) citations for the articles (47; 11.6%) published in the year 2011. Highest average citations was for the year 2008 (19.14) followed by 18.07 in the year 2006. On an average, 10.15 articles were cited within ten years.

Table 1
Year-wise Citations of Articles

Year Articles Published	No. of Articles cited	Percentage	Total No. of Citations Received	Percentage	Average No. of Citations Received
2006	14	3.4	253	6.14	18.07
2007	28	6.9	274	6.65	9.79
2008	44	10.8	842	20.43	19.14
2009	40	9.9	438	10.63	10.95
2010	46	11.3	543	13.17	11.80
2011	47	11.6	580	14.07	12.34
2012	64	15.8	429	10.41	6.70
2013	50	12.3	325	7.88	6.5
2014	57	14	319	7.74	5.6
2015	16	3.9	119	2.89	7.44
Total	**406**	**100**	**4122**	**100**	**10.15**

6.2 Mean number of citations

The Kruskal-Wallis test identifies the differences in total citations of articles among its publication years. When assessing pairwise comparisons, the year 2013 (M rank = 156.88) and 2014 (M rank = 157.86) published articles' citations significantly differ from the 2011 (M rank = 237.96), 2009 (M rank = 239.91) and 2008 (M rank =244.10) published articles' citations ($p < 0.05$). The hypothesis 'total numbers of year wise published articles' citations do not differ during the period" is rejected since the p value is less than 0.01 (Table 2).

Table 2
Mean number of Citations

Year of Articles Published	No. of Articles Cited	Mean Citations	Chi-square	p value
2006	14	217.07	31.916	0.000
2007	28	210.59		
2008	44	244.10		
2009	40	239.91		
2010	46	219.02		
2011	47	237.96		
2012	64	190.22		
2013	50	156.88		
2014	57	157.86		
2015	16	192.09		

6.3 Association between Year of Publication of Articles and its Level of Citations

Based on raw percentage, published articles in2006 has got 35.7% citations at low level, 21.4% at moderate level and 42.9% at high level. Whereas, published articles of 2007 got 28.6% citations at low level and 35.7% citations at moderate level and 35.7% citations at high level and so on. Highest percentage of high level citations (43.2%) was for the articles published in 2008. Altogether there are 27.8% low level citations, 45.8% moderate level citations and 26.4% high level citations for the ten-year study period. The hypothesis "the year-wise published articles' levels of citations are not constant in the ten-year period" is supported. There is significant relationship between year of articles' publication and its level of citations ($p < 0.01$) Table 3.

Table 3
Association between Year of Publication of Articles and its Level of Citations

Articles' Publication Year	Level of Citations			Total	Chi-square	p value
	Low	Moderate	High			
2006	5 (35.7%) [4.4%]	3 (21.4%) [1.6%]	6 (42.9%) [5.6%]	14 (100%) [3.4%]		
2007	8 (28.6%) [7.1%]	10 (35.7%) [5.4%]	10 (35.7%) [9.3%]	28 (100%) [6.9%]		
2008	8 (28.6%) [7.1%]	17 (38.6%) [9.1%]	19 (43.2%) [17.8%]	44 (100%) [10.8%]		
2009	4 (10%) [3.5%]	25 (62.5%) [13.4%]	11 (27.5%) [10.3%]	40 (100%) [9.9%]		
2010	12 (26.1%) [10.6%]	19 (41.3%) [10.2%]	15 (32.6%) [14%]	46 (100%) [11.3%]		
2011	9 (19.1%) [8%]	22 (46.8%) [11.8%]	16 (34%) [15%]	47 (100%) [11.6%]		
2012	17 (26.6%) [15%]	38 (59.4%) [20.4%]	9 (14.1%) [8.4%]	64 (100%) [15.8%]		
2013	23 (46%) [20.4%]	18 (36%) [9.7%]	9 (18%) [8.4%]	50 (100%) [12.3%]	42.485	0.001
2014	22 (38.6%) [19.5%]	27 (47.4%) [14.5%]	8 (14%) [7.5%]	57 (100%) [14%]		
2015	5 (31.3%) [4.4%]	7 (43.8%) [3.8%]	4 (25%) [3.7%]	16 (100%) [3.9%]		
Total	**113 (27.8%) [100%]**	**186 (45.8%) [100%]**	**107 (26.4%) [100%]**	**406 (100%) [100%]**		

a) The value within ( ) refers to row percentage
b) The value within [ ] refers to column percentage

6.4 Correlation between Year of publication and its Citations

There is a negative and weak association between year of publication of articles and its citations. The association between year of publication of articles and its citations is statistically significant ($p < 0.01$). The hypothesis "there exists a positive correlation between total year-wise published articles' citations and the concerned publication year" is rejected. The Spearman's correlation results reject this hypothesis showing that as the publication year of an article increases, its citation decreases (Table 4).

Table 4
Correlation between Year of Publication and its Citations

			Year	Citations
Spearman's rho	Year	Correlation Coefficient	1.000	-.226**
		Sig. (2-tailed)	.	.000
		N	406	406
	Citations	Correlation Coefficient	-.226**	1.000
		Sig. (2-tailed)	.000	.
		N	406	406

**. Correlation is significant at the 0.01 level (2-tailed).

7. Conclusion

The present study analyzes the citations of the DJLIT journal articles for the publication period 2006-2015. The study shows that there is significant difference in the total citations of articles published during the period. The levels of citations are not constant during the period of study. Out of the 406 citations majority (186; 45.8%) are at moderate level. In addition to that the correlation shows a weak and negative association between citations of articles and its publication year. Thus Google Scholar (GS) is the sole viable possibility for citation analysis of DJLIT journal. Google Scholar (GS) has emerged as a third alternative to the two well-known citation databases, the Web of Knowledge and Scopus. The free availability of Google Scholar and its extensive coverage is being looked at by scholars for evaluative studies despite its many limitations.

References

1. Agarwal, A., Durairajanayagam, D., Tatagari, S., Esteves, S., Harlev, A., Henkel, R., Roychoudhury, S., Homa, S., Puchalt, N.G., Ramasamy, R., Majzoub, A., Ly, K.D., Tvrda, E., Assidi, M., Kesari, K., Sharma, R., Banihani, S., Ko, E., Abu-Elmagd, M.,

Gosalvez, J.,&Bashiri, A. (2016). Bibliometrics: Tracking Research Impact by Selecting the Appropriate Metrics. Asian Journal of Andrology, 18 (2), 296–309.doi: 10.4103/1008-682X.171582.

2. Thelwall, M.,&Kousha, K. (2015). Web Indicators for Research Evaluation. Part 1: Citations and Links to Academic Articles from the Web. El Profesional de La Información, 24(5), 1699–2407. Available at https://recyt.fecyt.es/index.php/EPI/article/viewFile/epi.2015.sep.08/21884.

3. Naidu, Giri. P. (2017).Google Scholar Research Impact on DESIDOC Journal of Library &Information Technology: Citation Analysis. International Journal of Library and Information Studies,7(1), 168-175. Available at http://www.ijlis.org/Jan-Mar_2017_Vol-7_No-1.html.

4. Singh, Ravi Kant & Singh, A.P. (2017).Citation Analysis of International Journal of Library and InformationStudies on the Impact Research of Google Scholar: 2011-2015. International Journal of Library and Information Studies. 7 (4), 155-161. Available at http://www.ijlis.org/Oct-Dec_2017_Vol-7_No-4.html.

5. Swapan Kumar Patra (2014). Google Scholar-based citation analysis of Indian libraryand information science journals. Annals of Library and Information Studies, 61 (3), 227-234. Available at http://op.niscair.res.in/index.php/ALIS/article/view/7071.

6. FilisteaNaude (2017). ComapringDownloads,Mendeley Readership and Google Scholar Citations as Indicators of Article Performances. Electronic Journal of Information Systems in Developing Countries. 78 (4), 1-25. Available at https://www.researchgate.net/publication/312032771_Comparing_Downloads_Mendeley_Readership_and_Google_Scholar_Citations_as_Indicators_of_Article_Performance