

Identification of Important E-Journals from Article(S) Sought by the Users: An Analysis of Access Denied Usage Report

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Abstract

Counting Online Usage of Networked Electronic Resources (COUNTER), JR2 (Journal Report 2) - access denied to full-text articles by month, journal, and category; for the year 2016 and 2017 studied. This paper tries to identify what other e-journal sources apart from current licensed one, that the users looked online to meet day-to-day information requirements. The JR2 usage data downloaded from 13 e-journals platform / content provider for the purpose and analyzed data. This analysis found most frequently paper(s) sought e-journals, year, platform, and publisher wise number of access denied papers during the year 2016 and 2017. It also explored number of e-journals from which at least a full text document tried to download. Bradford's law of scattering applied to find core journals and found 23 e-journals based on JR2 access denied usage data. The study feels that like other methods and techniques employed by library and information professionals, the JR2 usage data analysis also an important tool to identify the best out of the best resources and help to bridge the gap in serials collection.

Keywords: Download Pattern, E-resources Usage Pattern, JR2, E-journals Access Denied, Usage Statistics

1. Introduction

Scholarly digital content has grown in recent years. Literature growth rates particularly in Science, Technology, and Medicine (STM) field are exponential. The commercial publishers, namely Elsevier, Springer, Taylor and Francis and Wiley alone hold 30% of the world's peer-reviewed journal literature (Van Noorden, 2015). Another study reports that more than half of peer-reviewed scientific articles published by top five profit-making publishing companies since the year 2006 (Larivière, Haustein, & Mongeon, 2015). In this scenario, it is impossible for a library to acquire all users' required scholarly and peer-reviewed digital resources. However, the library and information centre(s) in its effort fulfils information requirements of users by licensing most important electronic resources and supplying information by other means, such as resource sharing, Inter-Library-Loan (ILL), etc. It also ensures the availability of the best

possible electronic resources time to time reviewing core area literature publications; and overcoming challenges of sky racking price increase in journal publications and budgetary constraints. As the information technology enables anywhere, anytime access, advanced search and retrieval and other features, the usage and demand for information have increased many folds from the users.

Scientific Information Resource Centre (SIRC), formerly Library at Raja Ramanna Centre for Advanced Technology (RRCAT) has been subscribing number of digital resources to meet the information requirements of users. RRCAT is a unit of the Department of Atomic Energy (DAE) and a leading research and development organisation in the areas of laser, accelerator and its related fields.

It is a routine task of library and information professionals to evaluate the collections to offer better and user-friendly information services. To assess the collections professionals undertake various methods and techniques,

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such as bibliometrics, scientometrics study, user survey, usage study, circulation data analysis, journal impact factor, etc. As the publishers' platform has enabled various features including usage report to track user's literature search behaviour, for this study COUNTER JR2 data applied. The JR2 data downloaded and assessed to understand our user's digital resources need from various e-journals sources for which access denied. Presently, almost all e-journals publishing platform implemented COUNTER compliant standard release 4, as per the deadline date December 31, 2013 and facilitating services. COUNTER Release 4 enables librarians and online users to obtain usage data from the website of content provider, vendor, intermediaries and others. According to projectcounter.org website the Release 4 is optional only till December 2018; and will retire in the year 2021. The Release 5 usage statistics format and structure is already released, and it is mandatory from the year 2019 to implement by the content providers and publishers (COUNTER, 2012).

2. Literature Review

A number of peer-reviewed articles have been published on usage statistics. Review for a few notable papers only done here. A review article elaborates overview of various paper published on the topic e-journal usage statistics in collection management decisions over the year (Rathemacher, 2010). A usage analysis study conducted on science direct material science package during 2005-2015 found 50% of negligible journals and some nil used journals (Srivastava & Kumar, 2018). To avail cost benefit on consortium, a study concludes that the institutions be grouped based subject discipline for selection and negotiation of e-journals (Emrani, Moradi-Salari, & Jamali, 2010). Another case study applied usage statistics to find cost per use at University of Delhi, found that over the 10 year the cost per use increased by 41.77% (Kumar & Lalita, 2017). E-journals usage analysis case study conducted at Indian Institute of Technology Roorkee library identifies 10 most heavily used journals and reported 50% of journals were never used (Singh, 2016). Due to budget cut at University of Nevada, Las Vegas Libraries assessed the collections by applying usage statistics. It created a practical example of using benchmark in the decision-making process on collection assessment (Tucker, 2009). A study reports users' behaviour in accessing e-journals at IP(Internet Protocol)

address level usage of 29 scholarly journals published by American Chemical Society (Davis & Solla, 2003). All these studies are based on JR1 usage reports.

3. Objectives

The objectives of the study were to find:

- Year and platform wise access denied,
- Publisher wise access denied,
- Number of Journal sources access denied, and
- Most frequently access denied journals.

4. Methodology

Administrator account with login/password issued by the e-journals platform enable library administrator to manage licensed contents, register IP ranges, create groups, library holdings integration, SUSHI harvesting, view and download usage reports, etc. To have an administrative login feature, user must compulsorily license/subscribe at least an e-resource from the platform. The RRCAT SIRC has an Administrator account for 13 platforms and the usage data of JR2 were generated and download for the year 2016 and 2017. As journal usage statistics report is COUNTER compliant standard, data were downloaded in Excel or Comma Separated Values (CSV) file format. All the downloaded usage data files merged in a single excel file for each year. The merged file data were then analysed and results drawn.

5. Analysis and Results

No library and information centre is fully self-sufficient in holding information resources. All subscribed/licensed resources are also not heavily used, and even many electronic journals' contents never used are seen in JR1 usage report. The JR1 usage report only reveals, number of successful full-text article requests by month from the subscribed, free and complimentary titles of a platform. Therefore, to identify the best resources beyond licensed e-journals, the JR2 reports were analysed. The publisher's platform enables access to open access, free and complimentary e-journals along with consortia / subscribed titles as a bundle. As such, it was also noticed that in the JR2 usage reports has mixed of subscribed, unsubscribed titles. The reason for appearance in the JR2 usage reports could be beyond

licensed period and unforeseen access problem during the subscription period.

6. Year-wise Access Denied

13 platforms' JR2 data analysed found that there were 20863 papers in the year 2017 and 20836 papers in the year 2016 for which access denied. There is no much difference between these two years data; however, the source journals to which papers repeatedly tried were

almost same are noticed. The JR2 data compared with JR1 data shows, that the information requirement of users beyond existing licensed e-journals holdings is about 20% of overall full-text download from these 13 platforms. The users may have fulfilled the requirements with own arrangements or it may be of general reading and future needs. Also, from the 20% access denied papers, the most important papers were possibly requested through Inter-Library-Loan (ILL) service offered by SIRC. Table 1 shows year and platform wise access denied number of papers.

Table 1. Platform and Year wise number of access denied e-journals and papers

Platform	No. of Sources (2017)	% on total 2017 sources	No. of full-text papers	% on total 2017 papers	No. of Sources (2016)	% on total 2016 sources	No. of full-text papers	% on total 2016 papers
APS	5	0.36	120	0.58	3	0.25	158	0.76
Cambridge Core	32	2.33	767	3.68	18	1.53	164	0.79
HighWire Press	2	0.15	4	0.02	2	0.17	5	0.02
IOPscience	86	6.26	5537	26.54	81	6.88	4634	22.24
nature.com	61	4.44	1070	5.13	67	5.69	2681	12.87
OSA Publishing	14	1.02	1156	5.54	19	1.61	1746	8.38
SAGE Journals	38	2.77	108	0.52				0.00
Science Direct.com	278	20.25	1041	4.99	240	20.39	1105	5.30
Scitation	19	1.38	949	4.55	4	0.34	32	0.15
SPIE	11	0.80	849	4.07	9	0.76	420	2.02
SpringerLink	478	34.81	4440	21.28	454	38.57	6589	31.62
subscription. iucr.org	4	0.29	26	0.12	4	0.34	86	0.41
Wiley Online Library	345	25.13	4796	22.99	276	23.45	3216	15.43
Total 13 platforms	1373	100	20863	100	1177	100	20836	100

7. Publisher and Platform-wise Access Denied

As mentioned earlier, the JR2 access denied reports analyzed for those titles have no subscription/license during the study period with the publisher/platform. SIRC has been subscribing Sciencedirect, IEL (IEEE/ IET Electronic Library) e-journals through consortium agreement; and some core e-journals published by IOP, APS, and OSA publishers are subscribed with complete back files access. Table 2 visualizes the publisher wise access denied number of e-journal sources and its platform. 13 platforms that host 24 publishers' e-journals were identified. The e-journals published by

Springer, Wiley and Elsevier are most frequently looked e-resources that were not subscribed by SIRC from which users attempted to download large number of papers found.

Table 2. Publisher wide number of e-journals access denied

Publisher	No. of Sources	Platform
Acoustical Society of America	1	APS
American Association for the Advancement of Science	2	HighWire Press
American Association of Physics Teachers	1	Scitation

American Institute of Physics	13	Scitation
American Vacuum Society	2	Scitation
APS	6	APS
Cambridge University Press	37	Cambridge Core
Chinese Laser Press	2	OSA Publishing
Elsevier	393	ScienceDirect.com
IEEE Computer Society	1	Scitation
IMECHE	7	SAGE Journals
IOP	91	IOPscience
IUCr - International Union of Crystallography	4	subscription.iucr.org
John Wiley and Sons	433	Wiley Online Library
Nature Publishing Group	67	nature.com
Optical Society of America	14	OSA Publishing
Optical Society of America/IEEE	2	OSA Publishing
Optical Society of Korea	1	OSA Publishing
SAGE Publications	29	SAGE Journals
SAGE Publications Inc	1	SAGE Journals
SAGE Publications Ltd STM	1	SAGE Journals
SPIE	11	SPIE
Springer	623	SpringerLink
The Society of Rheology	1	Scitation

8. Number of E-Journal Sources Access Denied

Total 2550 journal sources were found for both the year 2016 and 2017. However, after merging two years data, 1743 individual journals title were only found from which at least a paper tried to download by the users. Out of 1743 unique journals, 459 journal sources were found only one paper for which access denied. Zero access denied journal sources were not taken up, as these were either subscribed complete contents or unsubscribed journals included in the JR2 reports by the platforms. It was found that 300 plus papers (35.07%) access denied were from only top

1.55% of total journals. 100 to 299 paper's access denied were 68 journals, that is 3.90%. 405 journals denied access for 3675 papers, that is 10 to 99 papers and 2 to 9 papers from 784(44.98%) e-journals.

Bradford law of scattering (Bradford, 1934) applied to identify access denied paper's distribution in journals. Figure 1 presents the distribution of papers in journal, where linear scale along the y-axis is number of papers and logarithmic scale along the x-axis is journals rank; and observed typical 'S' curve as per law of scattering. Also, as per Bradford's three zone-wise (Bradford, 1948) journals calculated; the number of journals in each zone was 23, 309, 1411 respectively.

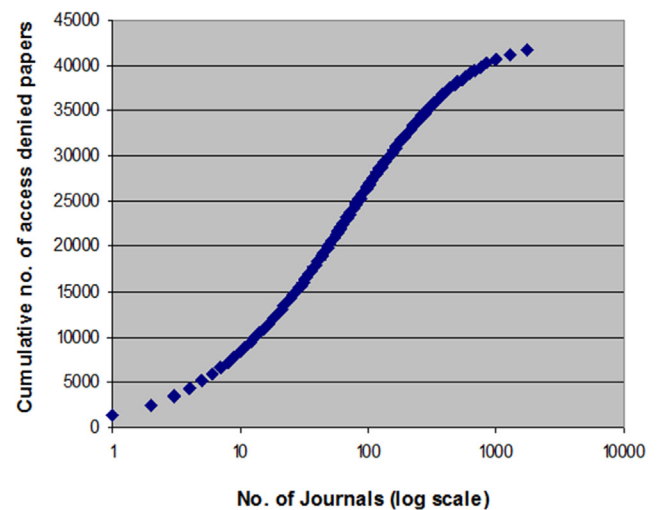


Figure 1. Access denied journals plotted as per Bradford's Law of Scattering.

In the core zone category 23 journals were found for which 300 plus papers for access denied. However, four journals namely, Journal of Physics D: Applied Physics, Applied Optics, Applied Spectroscopy, and Journal of Physics: Condensed Matter, the SIRC has already subscription; but these journals paper access denied may have from back volume files and unforeseen interruption in access during the subscription year 2016-2017. These journals excluded in the Table 3 as journal's back volume files subscribed from the year 2018; and next four journals considered in the rank as most frequently access denied journals.

Table 3. Most frequently access denied core e-journals

Serials Name	Publisher	Platform	Journal DOI	No. of access denied papers	% of total access denied (41699) papers
Optics InfoBase Conference Papers Series	Optical Society of America	OSA Publishing		1369	3.28
Proceedings of SPIE	SPIE	SPIE	10.1117/12	1038	2.49
Journal of the American Ceramic Society	John Wiley and Sons	Wiley Online Library	10.1111/(ISSN)1551-2916	878	2.11
Nanotechnology	IOP	IOPscience	10.1088/issn.0957-4484	848	2.03
Nature Nanotechnology	Nature Publishing Group	nature.com	10.1038/nnano	714	1.71
Advanced Materials	John Wiley and Sons	Wiley Online Library	10.1002/(ISSN)1521-4095	684	1.64
Pramana	Springer	SpringerLink	10.1007/12043.0973-7111	629	1.51
AIP Conference Proceedings	American Institute of Physics	Scitation	10.1063/apc	600	1.44
Journal of Materials Science	Springer	SpringerLink	10.1007/10853.1573-4803	525	1.26
Nature Photonics	Nature Publishing Group	nature.com	10.1038/nphoton	512	1.23
Semiconductor Science and Technology	IOP	IOPscience	10.1088/issn.0268-1242	509	1.22
Journal of Materials Science: Materials in Electronics	Springer	SpringerLink	10.1007/10854.1573-482X	487	1.17
Materials Research Express	IOP	IOPscience	10.1088/issn.2053-1591	414	0.99
EPL (Europhysics Letters)	IOP	IOPscience		397	0.95
Journal of Instrumentation	IOP	IOPscience	10.1088/issn.1748-0221	396	0.95
physica status solidi (b)	John Wiley and Sons	Wiley Online Library	10.1002/(ISSN)1521-3951	380	0.91
Physica Scripta	IOP	IOPscience	10.1088/issn.1402-4896	361	0.87
Chinese Physics C	IOP	IOPscience	10.1088/issn.1674-1137	353	0.85
Journal of Raman Spectroscopy	John Wiley and Sons	Wiley Online Library	10.1002/(ISSN)1097-4555	352	0.84
Laser Physics	IOP	IOPscience	10.1088/issn.1555-6611	325	0.78
Advanced Functional Materials	John Wiley and Sons	Wiley Online Library	10.1002/(ISSN)1616-3028	309	0.74
Physics in Medicine and Biology	IOP	IOPscience	10.1088/issn.0031-9155	306	0.73
The International Journal of Advanced Manufacturing Technology	Springer	SpringerLink	10.1007/170.1433-3015	304	0.73
Total				12690	30.43

9. Most frequently Access Denied Journals

E-journals from which 300 plus papers user's tried to download chosen to study this parameter. There are 23 e-journals identified as most frequently access denied. These 23 e-journals account total 12690 papers. Of the total access denied 41699 papers, these 12690 papers alone contribute 30.43%. It shows that subscribing/licensing these e-journals would definitely fulfil information requirement of users some extent in addition to already subscribing resources. The highly papers demanded top four journal sources are "Optics InfoBase Conference Papers Series (1369), Proceedings of SPIE (1038), Journal of the American Ceramic Society (878), Nanotechnology(848), and Nature Nanotechnology (714). Table 3 shows complete list of most frequently access denied journals.

From the list, Indian Academy of Sciences journal "Pramana (629)" papers is in seventh position; and the SIRC has subscription to this journal print issues and it is an open access journal. The users could try to download all the papers from platform at SpringerLink. The SIRC has provided in its homepage a direct link to journal webpage, the users seems either unaware of open access availability or just clicked the Digital Object Identifier (DOI) link provided at the online indexing and abstracting services webpage. Other reason could be user's preference for online digital contents.

Also, the journal "Nature Photonics (512)" ranked eleventh in the list has also subscription at SIRC since 2012. The papers for which access denied seems published between the year 2007(volume one) to 2011(volume five) for which no subscription or the platform temporarily suspended access due to non-receipt payment in time and other unforeseen reasons. However, it is of the view that adding back volume files to this e-journal also more useful.

10. Conclusion

This study identified 23 access denied e-journals as core journals in this category; and of the view, that subscribing / licensing these journals definitely useful to RRCAT user communities. It also found the reasons for the licensed titles appearance in the JR2 reports; that is papers looked were from beyond licensed period and unforeseen access

problem during licensed period. Many access denied e-journals/papers were from back volume files and even though these are available in print form at the library, the users' preference for online over print is observed. As the JR2 usage report includes both subscribed and unsubscribed contents, while undertaking similar analysis it is important to look very carefully entire usage reports. Though, JR2 access denied papers were only about 20% of total JR1 subscribed / licensed e-journals usage data; to identify most frequently paper's demanded e-journals for which no subscription, such study is very useful to fill the gap, decisions making and collection management processes of the libraries.

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