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**Usage of Open Access Journals in Research by  
Faculty Members and Researchers in Indian  
Institute of Technology, Delhi**

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**Abstract**

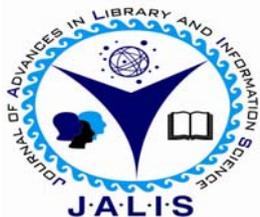
An attempt has been made to evaluate the usage of Open Access Journals on the research in present time and in an institution of higher learning by collecting data from Web of Science and from theses section of Central Library, Indian Institute of Technology, Delhi. This study reveals about the usage of Open Access Journals in the research output of IIT, Delhi within a span of 10 years i.e. 2002- 2011 and represents its analysis in the form of tables and charts. The study concludes that the use of Open Access Journals in research is increasing year by year and a better prospect can be seen for their increasing usage in the coming years, so there is a need to promote open access movement to make it a success.

**Keywords**

Open Access Journals; Open Access Publishing; Open Access Impact, Directory of Open Access Journals

**Electronic access**

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## INTRODUCTION

Today we are living in information age. Information is considered as a vital resource for dissemination of knowledge of one individual to another from the very early stage of human civilization to till today and which is also essential for all human activities and developments. The change in the trend of information related field, especially in relation to the collection, processing, storing and dissemination of information have resulted into the evolution of Open Access. It is rightly said by George Bernard Shaw "If you have an apple and I have an apple and we exchange these apples then you and I will still each have one apple but if you have an idea and I have an idea and we exchange these ideas then each of us will have two ideas. Open access enables people to exchange their ideas for a common purpose and with the help of a common platform. In the year 1980, the first online Open Access Journal appeared. In 1991, arxiv, the first subject based online archive was launched and in the year 2002 Open Society Institute launched the Budapest Open Access Initiative. Since its first inception Open Access movement was welcomed by the scholarly community for publishing their research. In case of Open Access, the community related to it, is the producer as well as consumer. Outside publishers with commercial interests create barriers in communication among scholars' community. Internet has provided an alternative means of peer review, publications and distribution and internet based scholarly communication of science without loss of time. Open Access movement is a boon for researchers as it advocates that the research funded out of public money should be publicly accessible. Number of universities, academic institutions and research funding agencies are making open access as mandatory requirement for creating a platform for the researchers to publish their academic work as well as to refer literature published by others.

## OBJECTIVES OF THE STUDY

1. To know about Open Access Journals and Open Access Publishing models.
2. To know the percentage of referring Open Access Journals by researchers and faculty of 10 selected departments in Indian Institute of Technology, Delhi.
3. To know the ratio of male and female researchers of 10 selected departments of Indian Institute of Technology, Delhi in terms of referring OAJ.

4. To know the year wise increment in referring open access journals by the researchers of 10 selected departments of Indian Institute of Technology, Delhi from 2002 to 2011.
5. To assess the importance of open access journals in research on the basis of collected data and conclusions drawn using different parameters.
6. To assess the trend of referring open access journals in research in Indian Institute of Technology, Delhi.

### **SCOPE OF THE STUDY**

This study will enable us to understand the importance of open access journals in today's scenario. Open access journals are becoming more and more popular these days so it is important to know about the percentage of using open access journals in research by researchers and faculty members in an Institution of higher learning like IIT, Delhi. This study throws light upon the increasing or decreasing trend of citing open access journals during 2002-2011.

### **METHODOLOGY**

#### **Information collection**

Supportive information has been collected from print and online scholarly papers and articles.

#### **DATA COLLECTION**

References for analysis have been taken from the end of each research paper and thesis. 100 papers and 100 theses have been traced for this purpose. The papers were accessed online through Web of Science and references of theses have been taken from Central Library, IIT Delhi by personal visit of the author.

#### **PROCESSING OF DATA**

Directory of Open Access Journals has been consulted to identify how many references are related to OAJ, thus percentage of use of open access journals can be taken out as a whole. The conclusions have been presented in the form of tables and charts.

#### **REVIEW OF LITERATURE**

Bailey (2007) in his study investigated the role of a library to preserve and promote Open Access Journals. The author studied about the concept of

Open Access and various aspects related to Open Access publishing and models like gold and green and discussed that Open access literature is, freely available, online, scholarly and royalty free and can be used with minimal restrictions. The author also discussed about self archiving of E- Prints, the impact of open access on libraries and what are the future aspects of library services in the environment of Open Access Journals? The study reveals the basic question "Why should we prefer open access literature?" and gives evidences to support the use of Open Access literature.

Bjork and Paetau (2012) studied about the status and challenges of open access to the scientific journal literature and discovered that the aim of Open Access was to enhance scholarly communications by delivering scientific publications on the internet without fees or restriction. Adoption of the gold model of OA, electronic access to publisher's scientific journals at no cost, has been slow in the US and UK, even if authors pay an extra Open Access charge. The more successful route has been green Open Access, publishing the original or modified version on author's personal homepages or in institutional or subject- specific repositories.

Chaudhuri and Thohira (2010) analyzed more than 1100 citations from eleven top science and medical journals for 2004, 2006 and 2008 and the data showed that the usage of open access journals increased from 2004-2008. Kousha and Abdoli (2010) analyzed the citation advantage for self archived open access agriculture research against its non- OA counterparts from 2005 to 2007 as reported by the journals citation reports and found that Open Access Journals are better option to publish research content by the researchers and refer the same for ongoing research.

Meera and Rehana (2010) in her paper gave a detailed view in understanding the open access journal movement. The study aims to demonstrate the methodology of compiling list of open access journals in an academic library environment and Sawant (2009) in her paper gathered the data related to open access journal initiatives in India with respect to its type, funding agency/ host organization, full text availability and article charges. Yasar (2007), in his paper investigated the research impact of OA articles as measured by the number of citations varies from discipline to discipline and concluded that Open Access Journals have an important place in research. Mukherjee (2008) in his paper investigated the trend of Open Access Journals publishing in the field of

Library and Information Science in terms of language, top level domain, country and time using authoritative print as well as online directories. The study identifies 124 e journals in the field of Library and Information Science that are accessible freely, either partially or fully, on the web.

Trier (2011) demonstrated the history of open access publishing, how it was evolved and its role to make available scholarly works to the researchers.

Walters and Linvill (2011) examined the characteristics of 663 Open Access Journals in Biology, Computer Science, Economics, History, Medicine and Psychology and compared all the journals with impact factors to comparable subscription of journals. Open Access Journals in the fields of Biology and Medicine are larger than the others, more likely to charge fees and more likely to have a high citation impact. Over all, the Open Access Journals landscape is greatly influenced by a few key publishers and journals. Xia and Nakanish (2012) revealed that open access articles in general receive more citations and articles in high ranked journals do not have a higher access rate. They concluded that articles in lower ranked journals will also have a greater rate of citations if they are freely accessible.

#### **OPEN ACCESS**

The label "Open Access" was coined at a meeting in Budapest in 2002, but the concept has existed since the earliest days of the Internet. As soon as the web emerged, many scientists rapidly saw its potential for making the sharing of scientific information efficiently in particular peer-reviewed journal articles. During the 1990's Open Access emerged in the form of small scale voluntary efforts by individual scholars or group of scholars, but during the first decade of this millennium several innovative publishers have entered the field. This development has in particular resulted in the creation of Open Access Journals funded by author charges. At the same time universities and research organizations have increasingly established institutional repositories, which often use open source software like D- space and E- prints. (Bjork and Paetau, 2012) Open access means free and online access to scholarly literature that can be freely disseminated further with proper.

#### **OPEN ACCESS JOURNALS**

These are scholarly journals, available online to the reader without financial, legal or technical barriers. Some are subsidized and some require payment on behalf of the author. Subsidized journals are financed by an academic institution or a government information centers; those requiring payment are typically financed by money made available to researchers for the purpose from a public or private funding agency, as a part of research grant. There have been several modifications of Open Access Journals that have considerably different natures; hybrid open access journals and delayed open access journals.

#### **OPEN ACCESS REPOSITORIES**

Open Access Repositories (OAR) act as Knowledge banks and offer educational materials and resources freely and openly for anyone to use and under some license to remix, improve and redistribute. One can share and make teaching and learning resources easier to reuse for a community and for the people everywhere. OAR increase collaboration among institutions and disciplines through sharing educational context, courses and curricula by utilizing innovative software tools and exploring research opportunities.

Institutional goals of Open Access Repositories are given below:-

1. Open Access Repositories allow authors/ right holders to deposit their articles and provide usage statistics showing global interest and value of institutional research thus forming a base for global research facilities.
2. Open Access Repositories publicize an Institute's research strengths, increases impact and usage of it and provide new contacts and research partnership for authors.

#### **DIRECTORY OF OPEN ACCESS JOURNALS**

The Directory of Open Access Journals (DOAJ) is one- shop for users of open access journals. The aim of DOAJ is to increase the visibility and ease of use of open access scientific and scholarly journals, thereby promoting their increased usage and impact. It covers all open access scientific and scholarly journals that use a quality control system to guarantee the content and publish research or review papers in full text. The contents of DOAJ are fully available. Users can register themselves freely online by just clicking on <http://www.doaj.org/> and their

registration will be accepted. The journals which intend to be a part of DOAJ should exercise quality control through an editor, editorial board and/ or a peer review system. (Directory of Open Access Journals, <http://www.doaj.org/about>, 12/2/2014).

### RESEARCH IMPACT OF OPEN ACCESS JOURNALS

The internet provides an opportunity; modern harvesting techniques and search engines to discover publications of relevance if they are deposited in an Open Access Repository with a particular metadata standard. Open Access Repositories give an access to a wide variety of journals to research scholars. This is evidence that articles available in Open Access repositories have more accesses and citations and therefore impact. Open Access Journals are normally available without charge. As author, researchers benefit because their research papers are given a much wider dissemination and can be read without restriction by anyone, this increases the impact of their research. Indeed, evidence is accumulating to show that open access articles are cited 25 to 250% more than Non- open Access articles from the same journal and year. As readers, researchers benefit because they will increasingly be able to access and use the full text of all the research published in their area, not just the research available to them via the subscription their institution can offer. (Pandian...et al, 2008)

### PRESENTATION OF RESULTS AFTER ANALYSIS OF DATA

**Table 1: Collection of Research Papers and theses for study**

The study is based on the analysis of 100 research papers referred from Web of Science and 100 theses referred from the Central Library, IIT Delhi for the collection of references.

Sl. No.	No. of Research Papers taken for study from Web of Science	No. of Theses taken for study from Central Library, IIT Delhi	Total No. of items taken
1	100	100	200

**Table 2: Total Number of references found from both the sources**

This table indicates that a total of 2000 references have been found from research papers and 4500 references from theses for analysis.

Sl. No.	No. of References from Research Papers	No. of References from Theses	Total
1.	2000	4500	6500

**Table 3: Percentage of References belonged to OAJ.**

The table below indicates that, after analysis of references with the help of Web of Science, 130 references from journals and 297 references from theses belonged to OAJ.

Sl. No.	Items	References belonged to OAJ.	Percentage
1.	Journals	130	6.50
2.	Theses	297	6.60

**Table 4: Final Percentage of References belonged to OAJ**

The table indicates that 427 out of 6500 (6.56 %) references belonged to OAJ.

Sl. No.	Total No. of references taken for analysis	Total No. of references belonged to OAJ	Percentage
1.	6500	427	6.56

**Table 5: Gender wise percentage of referring OAJ**

This table indicates that 79% of males and 21% of females are using references from OAJ and 75% males and 25% females are using references from OAJ in their research.

Sl. No.	Gender	Percentage of using OAJ in writing Research papers	Percentage of using OAJ in writing theses
1.	Male	79	75
2.	Female	21	25
3.	Total	100	100

**Table 6: Faculty and Students percentage of referring OAJ in writing research papers.**

The table that 70% of faculty and 30% of students are using references from OAJ.

Sl. No.	Category of author	No. of references taken from OAJ	Percentage
1.	Faculty	91	70
2.	Students	39	30
3.	Total	130	100

**Table 7: Department wise number and percentage of referring OAJ in writing Research Papers**

The below table indicates the percentage of references from OAJ belonged to 10 selected departments of IIT Delhi. Department of Chemistry is referring more number of OAJ for writing research papers.

Sl. No	Name of the Department	Number of references taken from OAJ	Percentage
1.	Department of Chemistry	25	19.23
2.	Department of Mechanical Engineering	22	16.92
3.	Centre for Biomedical Sciences	19	14.62
4.	Department of Bio-Chemical Engineering	17	13.08
5.	Department of Civil Engineering	14	10.76
6.	Department of Electrical Engineering	12	9.24
7.	Department of Chemical Engineering	9	6.92
8.	Centre for Rural Development	5	3.85
9.	Centre for Energy Studies	4	3.08
10.	Department of Mathematics	3	2.30
	Total	130	100

**Table 8: Department wise number and percentage of referring OAJ in writing Theses**

The below table indicates the percentage of references from OAJ belonged to 10 selected departments of IIT Delhi. Centre for Bio- medical Engineering more number of OAJ for writing theses.

Sl. No	Name of the Department	Number of references taken from OAJ	Percentage
1.	Centre for Bio-medical Engineering	51	17.18
2.	Department of Chemistry	47	15.82
3.	Department of Bio-chemical Engineering	40	13.47
4.	Department of Electrical Engineering	35	11.79
5.	Centre for Rural Studies	29	9.77
6.	Centre for Energy Studies	25	8.41
7.	Department of Civil Engineering	22	7.40
8.	Department of Mechanical Engineering	19	6.39
9.	Department of Mathematics	16	5.39
10.	Department of Chemical Engineering	13	4.38
	Total	297	100

**Table 9: Year wise number of references taken from Research Papers/ Articles belonged to OAJ**

The table indicates year wise usage of Open Access Journals from 2002 to 2011. A steady increment in terms of using OAJ can be seen during the course of time for writing research papers.

Sl. No.	Year	Total No. of references taken for study	References belong to OAJ	References belong to Non OAJ
1.	2002	181	2	179
2.	2003	150	3	150
3.	2004	158	6	158
4.	2005	170	9	170
5.	2006	155	11	155
6.	2007	199	15	199
7.	2008	182	16	182

8.	2009	247	21	247
9.	2010	273	22	273
10.	2011	285	25	285
11.	Total	2000	130	1870

**Table 10: Year wise numbers of references taken from theses belonged to OAJ**

The table indicates year wise usage of Open Access Journals from 2002 to 2011. A steady increment in terms of using OAJ can be seen during the course of time for writing research theses.

Sl. No.	Year	Total References taken for study	References belong to OAJ	References belong to Non OAJ
1.	2002	315	12	303
2.	2003	440	16	424
3.	2004	380	21	359
4.	2005	495	24	471
5.	2006	520	25	495
6.	2007	445	31	414
7.	2008	505	37	468
8.	2009	510	41	469
9.	2010	490	43	447
10.	2011	400	47	353
11.	Total	4500	297	4203

**Table 11: Year wise number and percentage of references belonged to OAJ in research papers and theses as a whole**

The table indicates that during 2002 to 2011 a steady growth can be seen from the data collected and analyzed. Before 2012 the usage of OAJ for reference was not worth but now it is growing year by year. The usage of OAJ in writing research papers and theses as a whole was almost 2% in 2002 and it has increased up to 10% in the year 2011.

Sl. No.	Year	References taken from research papers and theses	References belong to OAJ	Percentage
1.	2002	496	14	2.82
2.	2003	590	19	3.22
3.	2004	538	27	5.01
4.	2005	665	33	4.96
5.	2006	675	36	5.33
6.	2007	644	46	7.14
7.	2008	687	53	7.71

8.	2009	757	62	8.20
9.	2010	763	65	8.51
10.	2011	685	72	10.51
11.	Total	<b>6500</b>	<b>427</b>	<b>6.56</b>

## ANALYSIS

This study reflects the trend of referring Open Access Journals by the faculty and research scholars of IIT Delhi during 2002 to 2011. With the help of Web of Science 2000 references were taken from 100 research papers written either by researchers or by faculty members of 10 selected departments of Indian Institute of Technology, Delhi. The Theses section of Central Library, IIT, Delhi was consulted for collection of references mentioned in each thesis. A total of 4500 references were taken from 100 theses related to 10 selected departments. By using Directory of Open Access Journals (DOAJ), it is found that a total of 427 (130 (6.50%) from research papers and 297 (6.60%) from theses) references out of 4500 are belonged to Open Access Journals. As a whole it is found that 6.56% of total references belonged to Open Access Journals. It is now realized that the usage trend of Open Access Journals during 2002 to 2011 in research is between 6%- 7%. It is found that 76.4% of males are referring Open Access Journals in writing their research papers and in theses their percentage is 70. In the same way 23.59% of females are referring Open Access Journals in their research paper and in theses their percentage is 30. It is clear from the findings that males are more active in referring Open Access Journals in writing research papers and also in their Ph.D. research. Faculty and student ratio for referring Open Access Journals is 3:7. A study regarding the department wise usage of Open Access Journals reveals that the faculty and researchers of Department of Chemistry were the highest users of Open Access Journals in writing research papers with the percentage of 18.90. The researchers of Department of Biomedical Sciences were highest users of Open Access Journals in writing theses with the percentage 13.43. A steady growth of referring Open Access Journals in the research is noticed from 2002 to 2011. It is seen that before 2002 the impact of OAJ was less but during the course of time it has been increased and it is expected that this trend will continue in the same way in near future also.

## CONCLUSION

Open Access breaks the monopoly of traditional publishing and provides a separate path to refer

scientific and technological research papers/ articles at the users place without physical, regional and economical barriers. Open Access Journals are generally referred these days for research purpose because they are free from many licensing restrictions and available online round the clock. The technology i.e. Internet has made the concept OAJ possible. OAJ are the best solution to the problem of unavailability of scholarly journals at a common platform from where researches, students and teachers can access the full text of research of their respective areas. The usage and impact of OAJ is increasing year by year. Researchers and Faculty of today's Institutes of higher learning like IIT Delhi are referring OAJ in their research. The study depicts that the Impact of OAJ on the research output of IIT Delhi is between 6% - 7% and is increasing day by day and year by year. The main step to enhance the services of OAJ is to revolutionize OA movement and derive maximum output from it. OA Publishing is the only solution to give modern scientific and technological or even other areas of research a platform where it can stand, sustain and fulfill the literature need of scholarly society. OA movement is one of the biggest landmarks in the age of information explosion and every institution should do its best to support and utilize its products.

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