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## **Journal Collection Development Tool Based on Impact Factor and Table of Contents Service**

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### **Abstract**

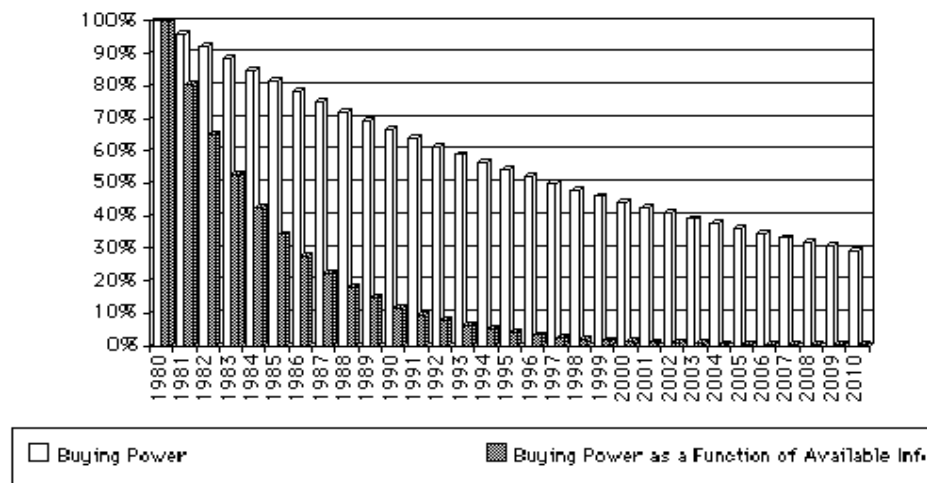
*Journals are the most important source of information in research work. This is especially true in the rapidly developing areas of science and technology. However, budgetary constraints and escalating costs of publications require that selection of journals for the library be done in a systematic and scientific manner. 'Impact Factor' is one of the means to find out the quality of the journal. This information and the 'Impact factor' for each journal can be made available on Intranet along with information of the availability or non-availability of the journal in the local library. This article focuses on work to develop a tool for an effective selection of journal for the JRD Tata Memorial Library (JRDL) of the Indian Institute of Science.*

## 1 Introduction

A rich and useful collection, which relates well to the information needs of the user community, is a valuable asset of any library. Building such a collection is an important task of librarians and information professionals. A major portion of the collection in research libraries is in the form of journals, as they are the most important source of primary information to the research community. Hence it is essential that title selection of journals should be done in a scientific manner by assessing the factors that effect the user community's information needs and the different options available to the library from the publishing industry.

## 2 Need for collection development tools

Collection development depends on various factors. One of them is the budget. For example, from a study done in the US, "During the ten year period from 1981 - 1991, the library acquisition budgets of 89 of the nation's finest schools more than doubled, and in real dollars increased by an average of 51% when normalized based upon the Consumer Price Index (CPI). Although these increases may seem impressive, ... the reality is that the average library lost 27% of its buying power."[4]



**Fig 1:** Library buying power as a function of available information from 1980 - 2010

Moreover, “During this time period... although the costs of books and monographs did not rise at quite this fast a rate, the cost of some serials (especially those in the sciences) increased over 20% per year.”[4] With libraries losing their purchasing power and increasing amount of information available for acquisition coupled with increasing costs, the collection development process needs to be done even more objectively. Hence there is a need for developing tools, which will help us make effective decisions regarding collection development of journals.

### **3 E-mail delivery Table of Contents (ETOC)**

ETOC is a service provided by NCSI, which is derived from latest Current Contents issues, brought out by Institute of Scientific Information (ISI), Philadelphia, USA, downloaded by NCSI via the Internet using FTP. It delivers every week, by e-mail, content pages along with abstracts of journals identified by the user in advance. It is however restricted to the IISc campus.

The ETOC users can enroll for the service thorough the Web by selecting journals of their choice. The enrollment form is received through e-mail and a copy of is sent to the user for confirmation. A profile is created for the user by assigning a profile number (Appendix A). The enrollment form indicates the availability of the journals in IISc library and also the Impact Factor of the Journal obtained from the JCR database. Every week the CC issues are downloaded from ISI’s FTP site. All the records are downloaded using ‘CCWin’, a program supplied by ISI. This downloaded file is transferred to a Linux machine and processed using C Programs, which have been developed in-house. Since there are about 210 users, a batch processing of the profiles is done by creating inverted files for the journals. Then they are compared with the profiles of the users and the output is obtained. The output is e-mailed to the users. The users can modify their profiles on the same website.

## 4 Journal Citation Reports

Institute of Scientific Information, Philadelphia, USA publishes the Journal Citation Reports (JCR), which provides a systematic and objective means of determining the relative importance of science and social sciences journals within their subject categories. Approximately 25 million citations are processed annually for inclusion in the ISI database. About 14 million of these citations refer to one of the nearly 6500 journals listed in the SCI JCR and the SSCI JCR. The JCR database gives the following five primary data fields with sort and filter options:

- Total Cites: Total number of times that a journal has been cited in a year
- Impact Factor: Frequency with which the average article in a journal has been cited in a particular year
- Immediacy Index: How quickly the average article in a journal is cited
- Articles: Number of articles published in the year of coverage
- Cited Half-life: Reflects the ongoing use of a particular journal

*Use of JCR:* JCR is helpful in answering many important questions about the current literature, such as:

- What journals are most frequently cited? (Total Cites)
- What journals have the highest impact? (Impact Factor)
- What are the hottest journals? (Immediacy Index)
- What are the largest journals? (Articles)

## 5 Impact factor

The JCR provides quantitative tools for ranking, evaluating, categorizing, and comparing journals. The impact factor is one of these.

**Definition:** Impact factor is a measure of the frequency with which the "average article" in a journal has been cited in a particular year or period. The annual JCR impact factor is a ratio between citations and recent citable items published.

Thus, the impact factor of a journal is calculated by dividing the number of current year citations to the source items published in that journal during the previous two years. Calculation for journal impact factor:

A= total cites in 1992

B= 1992 cites to the articles published in 1990-91 (this is a subset of A)

C= number of articles published in 1990-91

Impact Factor for 1992= B/C

Impact factor is useful in clarifying the significance of absolute (or total) citation frequencies. It eliminates some of the bias of such counts, which favor large journals over small ones, or frequently issued journals over less frequently issued ones, and of older journals over newer ones. All these factors being equal, the larger the number of previously published articles, the more often a journal will be cited.

## **6 Objective**

The objective of this study is to develop a collection development tool for Journals which provides a means of comparing:

- 1) The impact factor
- 2) Statistics from ETOC
- 3) Information about the availability of Journals in the library.

Impact Factor is one of the means to find out the quality of the journal. It gives a quantitative measure of the effect of a journal has in its area of specialization. The SCI Journal Citation Reports gives the impact factor of more than 4500 journals in various disciplines of Science and technology.

Statistics as to which are the most popular journals is obtained from the profiles of the users who have subscribed for ETOC. This information and the Impact factor

for each journal, is made available on the intranet along with information about the availability or non-availability of a journal in the IISc library. This information helps the users in general and the selection committee in particular to select journals for the library.

## 7 Methodology

Journal Collections used for the study:

- Journal Collection of IISc Library (J-IISC, provided by the Library)
- Journals covered by Current Contents - (J-CC, from ISI)
- Journal Citation Reports - 1996 (J-JCR, from ISI)

Comparison of IISc collection with Journal Citation Reports:

A record in IISc Collection list:

```
23 . ACTA ASTRONAUTICA
      NETH
      ISSN : 0094-5765
      Subsc Prd. : Jan - Dec,2000
```

A record in JCR list:

```
"ACTA ASTRONAUT " , "ACTA ASTRONAUTICA " ,
"0094-5765" , "373" , "0.063" , "0.012" , "85" , "99.9"
```

JCR database also allowed the records to be downloaded by subject categories. About 180 subject categories were broadened to 25 categories.

Records from JCR database are downloaded into a text file. The ISSN and Impact factor are extracted. From the J-CC the Journal titles for these ISSN's is obtained. The subject code is also added. Then the records are compared with the J-IISC list to add information of the availability of the title in the library.

Journals subscribed to by the ETOC users are obtained from their profiles. Number of times a Journal has been subscribed to is also obtained. If this journal is available in JCR, this information is added to the list obtained above.

This database can be browsed in alphabetical order or by subject category. It can be further ranked by Impact factor or number of ETOC users. The website also lists the top 100 journals ranked by Impact factor.

These records are imported to a Mysql database. A search interface is provided.

## **8 Software specification**

- Operating System : Linux
- Programming Languages : C, Perl
- RDBMS : Mysql

## **9 Limitations of this tool**

- This collection development tool is limited to journal covered by JCR. JCR covers journals, which have an impact factor above a certain threshold value. Hence many Indian journals are not covered by JCR. In some disciplines like agriculture sciences there are journals, which are relevant to the local research community even though they are not internationally acclaimed and do not have a high impact factor.
- ETOC is not a uniformly popular service in IISc. Statistics given in the table below show that Chemistry related departments use the ETOC service excessively. Hence the statistics may not give an accurate measure of the popularity of the journals.

No of Prof.	Department	No of Prof.	Department	No of Prof.	Department
24	Solid State & Structural Chemistry Unit	7	Nat. Centre for Science Info.	2	Molecular Reproduction Dev. & Genetics
21	Aerospace Engg.	7	Mechanical Engineering	2	Sophisticated Instrumentation Facility
18	Chemical Engg.	7	Molecular Biophy.Unit	2	Centre For Electronic Design & Tech.
17	Civil Engg.	7	Instrumentation	2	Library
17	Centre For Ecological Sci.	5	Electrical Comm.Engg.	1	Supercomp. Edu. & Research Centre
14	Inorganic & Physical Chem.	4	Organic Chem.	1	Materials Res. Centre
10	Metallurgy	4	Computer Sci. & Automation	1	Centre For Theoretical Studies
10	Mathematics	4	Centre For Atmos. & Oceanic Sci.	1	Bioinformatics
9	Biochemistry	3	Electrical Engg.	1	Biochemistry
8	Physics	3	Microbiology & Cell Biology		

**Table 1:** Department wise statistics of ETOC service usage

- We are not aware with what criteria ETOC users use to select journals for the service, weather to supplement or complement their library reading or browsing activity. For example a user may choose journals already available in the library and go for the full article if he/she finds something of interest in the abstract from ETOC issue. Or the user may deliberately choose journals, which are not available in the library, so that he/she may know when something of interest is published in that journal and then go for the full text by inter library loan or from document delivery services.

Hence this tool is not the ultimate tool but only one of the many factors to be considered in the selection of journals for the library.

## 10 Conclusions

With the help of these tools it is possible to view journals subject wise or alphabetically (Appendix B). Further one can rank journals by Impact Factor or by



number of ETOC subscribers. This gives a fair idea of what are the most relevant and most used or popular journals among the user community. But this cannot be considered as the most accurate measure while deciding as to which are the most important journals in the library. Journals relevant to the local community may not be available in JCR or Current Contents. Even if present, they may have a low impact factor. However, it can help taking decisions while going for packages offered by publishers by looking at how good and relevant are their journals.

## 11 References

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4. HAWKINS (Brian L.), Creating the library of the future: incrementalism won't get us there!  
<http://www.virtualschool.edu/mon/Academia/HawkinsLibraryOfFuture.html>
5. ISI's journal citation reports. <http://www.isinet.com/isi/products/citation/jcr/>
6. OUALLINE (Steve). Practical C programming. 3rd ed, O'Reilly : Cambridge, 1997.
7. GOTTFRIED (Byron S.). Programming with C. Tata McGraw-Hill Publishing Company Ltd. : New Delhi, 1991.

**Appendix A: Sample ETOC Profile**

ET0188

Nisha Mathew

IPC

nisha@ipc.iisc.ernet.in

N-ANGEWANDTE CHEMIE-INTERNATIONAL EDITION

N-JOURNAL OF ORGANOMETALLIC CHEMISTRY

Y-JOURNAL OF THE AMERICAN CHEMICAL SOCIETY

Y-JOURNAL OF THE CHEMICAL SOCIETY-DALTON TRANSACTIONS

Y-CHEMICAL COMMUNICATIONS

Y-CHEMISTRY-A EUROPEAN JOURNAL

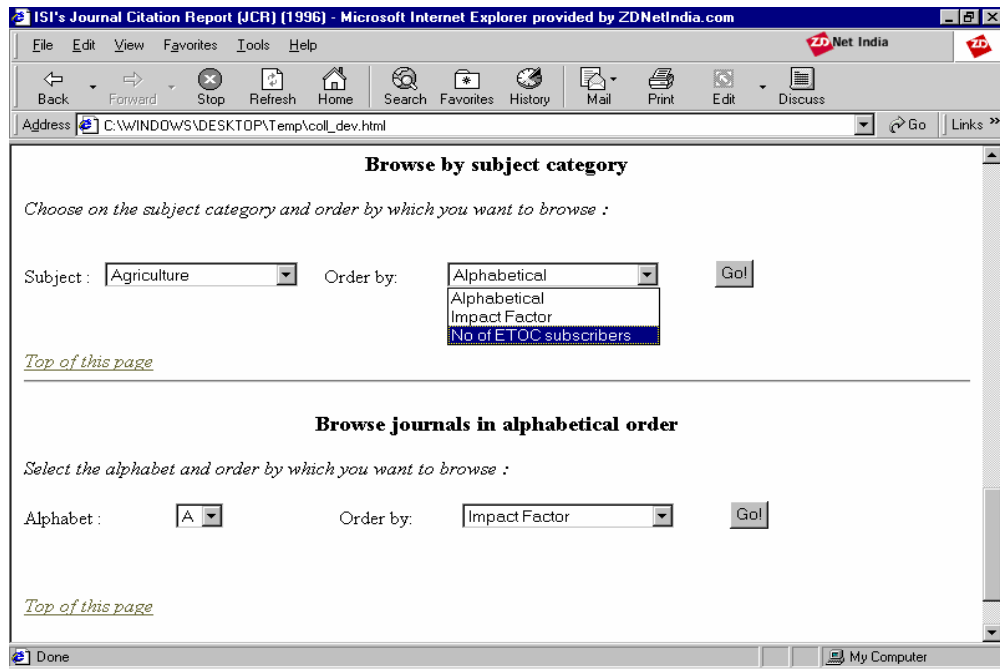
Y-INORGANIC CHEMISTRY

N-INORGANIC CHEMISTRY COMMUNICATIONS

Y-INORGANICA CHIMICA ACTA

Y-ORGANOMETALLICS

## Appendix B: Snapshots of the service



Interface of the collection development tool

**List of Journals in Geology**

Title	ISSN	Impact Factor	Subscribed by IISc	No. of ETOC subscribers
GLOBAL BIOGEOCHEMICAL CYCLES	0886-6236	4.14600	N	0
ANNUAL REVIEW OF EARTH AND PLANETARY SCIENCES	0084-6597	3.93500	N	0
PALEOCEANOGRAPHY	0883-8305	3.36800	N	0
CLIMATE DYNAMICS	0930-7575	3.34900	N	4
LIMNOLOGY AND OCEANOGRAPHY	0024-3590	3.26500	N	0
OCEANOGRAPHY AND MARINE BIOLOGY	0078-3218	3.19000	N	0
JOURNAL OF CLIMATE	0894-8755	2.93000	Y	4
AMERICAN JOURNAL OF SCIENCE	0002-9599	2.89900	N	0
BULLETIN OF THE AMERICAN METEOROLOGICAL SOCIETY	0003-0007	2.83000	Y	3
JOURNAL OF PETROLOGY	0022-3530	2.77200	N	0
EARTH AND PLANETARY SCIENCE LETTERS	0012-821X	2.67000	N	0

List of journals by number of ETOC subscriber

JCR Report 1 - Microsoft Internet Explorer provided by ZDNetIndia.com

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss

Address <http://144.16.72.156/cgi-bin/jcr/etocsubj1.pl?title=geology&head=Geology&order=etoc> Go Links

### List of Journals in Geology

Title	ISSN	Impact Factor	Subscribed by IISc	No. of ETOC subscribers
CLIMATE DYNAMICS	0930-7575	3.34900	N	4
JOURNAL OF CLIMATE	0894-8755	2.93000	Y	4
BULLETIN OF THE AMERICAN METEOROLOGICAL SOCIETY	0003-0007	2.83000	Y	3
GEOPHYSICAL RESEARCH LETTERS	0094-8276	2.19500	Y	3
QUARTERLY JOURNAL OF THE ROYAL METEOROLOGICAL SOCIETY	0035-9009	1.99400	Y	3
WATER RESOURCES RESEARCH	0043-1397	1.89300	Y	3
MONTHLY WEATHER REVIEW	0027-0644	1.85600	Y	3
ADVANCES IN WATER RESOURCES	0309-1708	1.00000	N	3
JOURNAL OF PHYSICAL OCEANOGRAPHY	0022-3670	1.94700	Y	2
WATER RESEARCH	0043-1354	1.67400	N	2
JOURNAL OF APPLIED METEOROLOGY	0894-8763	1.38300	Y	2

Done Internet

List of journals by number of ETOC subscriber