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Accessing and Economics of Electronic Journals at the Indian Institute of Astrophysics Library: A Case Study

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Abstract

While technology progresses rapidly in Library and Information centers, it has become imperative to gather various opinions and cost effectiveness of the electronic-journals (e-Journals) in the libraries. The e-journals have opened up many service opportunities for academic libraries. Indian Institute of Astrophysics library is no exception in facing this transition. The Institute has been accessing the electronic versions for the last couple of years for some of the journals, which were acquired in print format for many years. This paper briefly describes the introduction of electronic journals in the Indian Institute of Astrophysics (IIA) library, the cost factors and their usage by the scientists. It also discusses the problems faced by the libraries in handling electronic journals.

1 Introduction

Recent developments in information format and retrieval has had a definite impact on scientists, who have been required to change their methodology in accessing information. In this paper we have tried to bring out the changed concept, the benefits, the cost factor and also library's participation in enhancing the services towards retrieval of electronic information for the users.

Online journals are fast becoming a major source for scholarly information. At present they coexist with print media and there are very few stand alone electronic journals in the field of physics and astronomy. During the present decade the number of electronic journals will increase to match the print subscriptions, as technology is already there and it is only a matter of time and policy before more E-journals become available. However it is not clear whether printed version will disappear altogether. Surveys (Holmquist,1998 , Boyce and Dalterio,1996) have shown that scientists are still not comfortable with the electronic version, and have shown a preference to the print media, hence printed version will continue for some more years before E-journals become more popular.

Most major publishers are currently offering, or soon plan to offer online equivalents to their traditional print serials. There are some features, which are different between the print version and the electronic version. For example keyword searching, hyperlinks in references and sometimes video/audio multimedia facets are some features available only in the on-line version (Rowland ,1997). To make optimum use of the features which are available only in the on-line version, scientists have been persuading the librarians to subscribe to both the print as well as electronic versions of the journals, in the libraries.

2 Electronic journals

Electronic journals are often referred to interchangeably as “electronic serials”, “online journals” and “electronic periodicals”. University of Nebraska-Lincoln, defines it to be “a

full text electronic publication, which may include images, and is intended to be published indefinitely”(University of Nebraska-Lincoln, 1994, p.80). Lancaster (1995) defined it as “a journal created for the electronic medium and available only in this medium”. Electronic serials may be defined very broadly as any journal, magazine or newsletter which is available over the Internet. The titles can be electronically accessed using different technologies such as World Wide Web (WWW), gopher, ftp, telnet, e-mail, or listserv.

3 Indian Institute of Astrophysics Library

Indian Institute of Astrophysics Library is a special library caters to the needs of about 200 scientists. The library has its main office at Bangalore with branches at Kodaikanal, Kavalur, Hoskote, Hanleh, and Gauribidanur. The scientists carry out research mainly in the areas of Astronomy, Astrophysics, and in some branches of theoretical physics. The library also has a fairly good collection of books and journals in the areas of Mathematics, Electronics and Computer Science.

IIA Library has a collection of 15,000 Books, 19,000 bound volumes of journals and subscribes to 150 journals. Out of 150 journals, some journals are available online in the full-text format in addition to the print subscription. Till 1998 there were only traditional print subscriptions. At present some of these journals can be accessed online. Though the access is through IP authentication for most of the journals, a few of them require password for full-text access. The library homepage facilitates the users by giving access to the individual journal homepages, by well-maintained links, thus avoiding the hassle of remembering the password or the URL required. Further, these journals can be referred online at two more field stations of IIA, namely Hoskote and Kavalur. The dynamic IP addressing and access has given us the benefit of reaching these electronic journals, from different physical locations, just by subscribing to a single copy of the print journal.

Table No. 1 gives the subject break down of all the journals received by IIA library.

Table 2 gives the number of journals both Print and Electronic versions received by the library.

TABLE NO. 1: Subject-wise Classification of Journals received by IIA Library

Subject	Ast	Phy	Sc-general	Eng	Geophy	Com Sc	Elec	General	Others	Total
No. of Jls	64	28	21	9	7	4	3	10	4	150

Ast-Astronomy , Phy-Physics , Sc-Science, Eng-Engineering, Geophy- Geophysics, Com. Sc- Computer Science, Elec- Electronics.

Table No. 1, shows that about 42.66% of the total number accounts for astronomy journals, 18.66% for physics journals , 14% belong to science-general group and only 6% are engineering journals. There are 7 geophysics journals which constitute 4.6% of the total number. In computer science we have 4 journals and in electronics there are only 3 journals.

TABLE NO.2: Number of Print Only, Print + Electronic and Electronic Only Journals

	No. of jls	Print only	P+E	E only
Foreign	110	77	31	2
Local	40	35	5	
Total	150	112	36	2

Table No. 2 shows that about 73.3% of the total number of journals are foreign journals among which 70% constitute print only version and 28.18% are print + electronic version. There are only two electronic journals , which are PROLA and New Journal of Physics. We have 40 Indian journals which constitute 26.66% of the total number. About 87.5% of the local journals belong to print only version and there are 5 local journals which provide both print and electronic version.

Publishers vary in their policy in regard to electronic version of their journals. They can be classified into 3 broad categories (1) Publishers in this group permit the user to log into their site and browse the journals if the library has a print subscription. Here the electronic version is free. (2) In the second category, publishers are willing to give access to electronic journals, provided a small amount ranging from 10 to 20% is paid over and above the print subscription. (3) In the third category, we have a small number of journals which are electronic alone.

Table No. 3a gives the list of journals to which we have access only to contents and some abstracts too. Table No.3b gives journals for which the publishers have not provided online access.

TABLE NO. 3a: E-Journals to which IIA Library has Access to Contents and Abstracts Only

Journal	Access to Contents	Access to Abstracts	Cost of Print version in Rs.	Cost of E version in Rs.
1. Astrophysics & Space Science	Yes	No	96771.50	19391.30
2. Celestial Mechanics & Dynamical Astronomy	Yes	Yes	56597.40	11319.50
3. Experimental Astronomy	Yes	No	19387.60	3877.50
4. Journal of Optical Society of America A	Yes	Yes	57479.75	13467.50
5. Journal of Optical Society of America B	Yes	Yes	57262.70	13407.50
6. Nature	Yes	No	24660.50	51140.25
7. Solar Wind	Yes	No	115904.00	23180.80
8. Space Science Reviews	Yes	No	71549.55	14310.00
Total			499613.00	150094.35

Although we have print subscription to the above 8 journals for which we have paid Rs. 4,99,613.00 we are not able to access their online counterparts for want of the additional amount of Rs. 1,50,094.35 for their online access. However there is an access to the table of contents and in case of some journals we can read the abstracts too.

TABLE NO. 3b : Journals for which the Publishers have not provided Full-text Access

Journal Name	Access Full-text	Access Abstracts	Access Contents
1. Astronomy	No	No	Yes
2. Industry Week	No	Yes	Yes
3. New Scientist	Some	Yes	Yes
4. Resonance	Some	Yes	Yes
5. Scientific American	Selected	Yes	Yes
6. Sky & Telescope	No	No	Yes

Full-text is not available for the above-mentioned journals (Table no. 3b) as the publishers themselves have not provided full-text access whereas we can access the table of contents and for some journals the abstracts also.

4 Economics of electronic journals

In the context of shrinking or stable library budgets, and of rising cost in serial print subscriptions, it is important for research and academic libraries to understand the trends and implications of the digital information revolution. The librarians and information professionals should anticipate the rising cost of the serial publications, and this will help in financial planning and budgeting in any library (Lusting,1997). In the Table (4a), we have listed the journals for which we have access to the electronic version in addition to the print. The cost mentioned for these journals, include both print and electronic versions. There are three categories or options offered by the journal publishers for the e-journals access content-wise and cost-wise.

Access to full-text articles

- a) by paying the print cost alone, where online access is absolutely free (no hidden cost) example: Astronomical Journal, Publications of Astronomical Society of Pacific, Astronomy and Astrophysics, Monthly Notices of the Royal Astronomical Society.

- b) by paying the print + online combined cost, where online cost is little more in addition to print cost (very nominal). But the publishers make the clients believe that the online access is free with print subscriptions. Example: Elsevier journals – Advances in Space Research, Chinese Astronomy and Astrophysics, (minimum of 2 to 10% increase between consecutive years online access)
- c) by paying for print and an additional 20 to 25% more for electronic access. This demand is more visible from their quote. Example: Kluwer Academic-Solar Physics, Astrophysics and Space Science, Earth, Moon and Planets.
- d) by paying for the print + online version – An additional 20 to 25% more than the print. Some publishers do not have an option of providing only the print version. Hence the clients are left with no choice, except to pay for the print + online or electronic access only. The increase of 20% has the advantage of having a print copy over the online access alone. Example: American Institute of Physics Journals – Physical Review, Physical Review Letters
- e) Sometime, the publishers have quoted an enormous additional cost for the online access. In the case of ‘Nature’, the amount quoted for the print + online is £ 750 plus £ 0.31 per access by an individual.

At IIA, we have been invoiced for 50 scientists + researchers access to online as,

Base price for institutions (print included) = £ 750.00

Online access to Nature

@ £ 0.31 per person × 50 users = 15.00

Total = £ 765.00

This online cost is directly proportional to the number of users in any organization. The actual print alone cost is £ 370.00 which entitles us to get the issue by airmail. By paying £ 765.00 for online access + print, we end up paying more than 100%.

Currently, Subscription to Nature on-line is under review in IIA.

TABLE NO. 4a: List of Journals Accessible in Print + Electronic versions at the Bangalore campus.

Sl. No.	Electronic Journals	Cost in Rs
1.	Advances in Space Research	132360.80
2.	Annales Geophysicae	55076.80
3.	Astronomical journal	21288.80
4.	Astronomy & Astrophysics	124987.45
5.	Astronomy & Astrophysics Review	12357.60
6.	Astronomy & Geophysics	10220.00
7.	Astronomy Letters	
	}	121716.40
8.	Astronomy Reports	
9.	Astroparticle Physics	26611.00
10.	Astrophysical Journal	26148.20
11.	Chinese Astronomy & Astrophysics	55073.20
12.	Computers Today	338.00
13.	Dataquest	360.00
14.	Electronic & Political Weekly	800.00
15.	Geophysical Research Letters	61645.00
16.	Jl. Geophysical Research A Space Physics	111210.85
17.	IAU Circular	4998.25
18.	Int. Jl. of Modern Phy. D	11668.40
19.	J.A.S.T.P.	120235.45
20.	J.Q.S.R.T.	209139.30
21.	M.N.R.A.S	188440.00
22.	New Astronomy	24204.45
23.	New Astronomy Reviews	32581.10
24.	PC Magazine	4044.89
25.	PCQuest	715.00
26.	Physical Review A(PR-A)	107138.00
27.	Physical Review Letters(PRL)	144856.40

Sl. No.	Electronic Journals	Cost in Rs
28.	Physics of Fluids	
29.	Physics of Plasmas	141848.20
30.	Planetary & Space Science	115376.00
31.	Pub. of Ast. Society of Australia	17500.00
32.	Pub. of Ast. Society of Pacific	15735.00
33.	Radio Science	23741.65
34.	Reviews of Geophysics	13282.35
35.	Reviews of Modern Physics(RMP)	2568.00
36.	Siam Journal of Applied Mathematics	22214.40
Total:		19,731,29.30

We are able to access both print and electronic versions of the above mentioned 36 journals by paying Rs.19,731,29.30.

The following table (Table (4b)), highlights the expenditure on those journals, where we have saved considerable amount of money by paying for only one print or print + online access at the Bangalore library.

TABLE NO. 4b: List of Journals Accessible Electronically at Hoskote and Kavalur

Sl. No.	Electronic Journals	Cost in Rs P + E
1.	Astronomical journal	21288.80
2.	Astronomy & Astrophysics	124987.45
3.	Astrophysical Journal	26148.20
4.	Computers Today	338.00
5.	IAU Circular	4998.25
6.	Int. Jl. of Modern Phy. D	11668.40
7.	M.N.R.A.S	188440.00
8.	PC Quest	715.00
9.	Physical Review A(PR-A)	107138.00
10.	Physical Review Letters(PRL)	144856.40
11.	Physics of Fluids	

Sl. No.	Electronic Journals	Cost in Rs P + E
12.	Physics of Plasmas	141848.20
13.	Pub. of Ast. Society of Pacific	15735.00
14.	Reviews of Modern Physics(RMP)	2568.00
		Total: 790729.70

Table no. 4b lists 14 journals which are accessible by two more stations of IIA namely, Hoskote and Kavalur, by virtue of paying for one subscription at our Bangalore station. This has amounted to a saving of nearly 20% of our budget. The amount spent on these journals enable us access the online version alone in other physical locations of our field stations. If the IP addressing was not feasible, we would have bought the second and third copies of the same journals for these field stations, thus incurring the extra expenditure on multiple print copies.

PROLA: We have online-only access to PROLA. PROLA is the American Physical Society's Physical Review Online Archive. It currently consists all of the Physical Review from 1985, Physical Review Letters (PRL) back to its 1958 and Reviews of Modern Physics (RMP) from 1929. The actual subscription price of PROLA is \$ 600. But there is an option in which institutions subscribing to atleast one Physical Review or RMP may subscribe PROLA for \$ 390. Since IIA Library subscribes to PRL, PR-A, and RMP, the amount which we save is \$ 210 (\$ 600- \$ 390). Again an opportunity for the libraries to have the benefit of access to archives at a reduced cost.

5 Advantages of e-journals

Accessibility: Electronic version is accessible earlier than the printed copy. Publications of e-journal saves the turn-around time, i.e., the time lag in submission, refereeing, revision, editing, composing, printing, binding, and forwarding which is eliminated by using computer and communication networks. This reduces the gap between author and

the end-user. Users can access a particular article or a journal within minutes, or even seconds, if required equipment is available. E-Js allow intelligent full-text retrieval based on past use and interest.(*Glasgow University Library*)

Multiple Access: E-Js are not restricted to a single user nor to a particular location but typically available from any networked PC on the campus, although sometimes there may be restrictions to IP addresses, or to a limited number of simultaneous accesses. An author's article, once published in online journal reaches to a wider and diverse segment of audience whom the author could never have reached through the first publication in print done.

Costs: Online journals will be comparatively less expensive than the current print journals as they don't have paper, printing and postage cost. The electronic subscription to journals in most of the cases are linked to its printed counterparts, i.e., it may be offered free with print subscription or priced at a fixed percentage over the print subscriptions.

Archiving: E-Js are complete as there won't be any missing and there are a good number of archived volumes of a selection of journal titles from their first issue through recent back issues. Articles are exact facsimiles of print originals.

Multimedia Capabilities: Besides the traditional plain text, tables, figures, and graphics, other innovative ways of presenting research results can be supported by electronic page layout. Interactive three-dimensional models, motion video and sound are a few possibilities (*Gulati, 1999*).

6 Disadvantages of e-journals

Technological Barriers: E-journals rely on technology and equipment for storage and display. There may be delay in access due to incompatible hardware and software or if

connection speed is too slow and sometimes not every member of academic staff has their own desktop PC in direct connection to good printing facilities. (*Chan, 1999*)

Economic Barrier: Some publishers have included their set up costs in the subscription cost to the clients. In such cases, the libraries will be paying more cost to the e-journals in addition to the print journals. While electronic publication will eventually reduce the expenses of both publishers and libraries, right now it is raising those expenses, as both parties have to handle print and digital media at the same time.

Inconvenient to Use: Ease of use i.e., reading at a convenient time and place, is not possible with e-journals. People read up to 25-30% more slowly on a computer screen than on paper. There is a psychological feeling that researchers generally read more outside their workplace, thus requiring portable reading material (*Gulati, 1999*).

In the case of interlibrary loan procedure, most of the publishers have blanket prohibitions on the use of electronic editions between the libraries. This is a disadvantage voiced by many libraries, against the electronic access. Fortunately, some publishers have come to the rescue of the librarians by changing their policies. Electronic editions of journals of those publishers can now be used to satisfy interlibrary loan requests, but only by printing out the requested articles and sending them out in the printed form. Libraries will thus have the same functionality as before (or even better, since there will be no need to find volumes on shelves and make photocopies).

Copyright: The present copyright laws are inadequate, especially in case of E-Js because E-Js presently emphasize into access instead of ownership. While commercial publishers are experienced in this area, they are asserting their entitlement to copyright and intellectual property rights through various licensing policies. Previously the copyright law protected a work only if an author or publisher formally registered it, which the publisher invariably did. Now the legal balance of control shifted from the publishers enforce tighter

control over internet copyright, dissemination and pricing than exist in the traditional print world.

7 Conclusion

E-journals possess many advantages and disadvantages. Librarians need to be able to identify and balance the factors that would make e-journals a success or failure in their libraries. There is general consensus that e-journals would not replace but coexist with the print format.

8 References

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10. University of Nebraska-Lincoln University of Nebraska-Lincoln journals working group report. *In* Parang and Saunders [eds.], *Electronic journals in ARL libraries, issues and trends*, ARL : Washington .1994.

URL for Full-text Journals

1. Advances in Space Research
<http://www.elsevier.nl/locate/asr>
2. Astronomical Journal
<http://www.journals.uchicago.edu/AJ/>
3. Annales Geophysicae
<http://link.springer.de>
4. Astronomy & Astrophysics
<http://www.edpsciences.fr/aa/>
5. Astronomy & Astrophysics Review
<http://link.springer.de>
6. Astronomy & Geophysics
<http://www.blackwell-science.com/aag>
7. Astronomy Letters
<http://ojps.aip.org/asl/>
8. Astronomy Reports
<http://ojps.aip.org/asr/>
9. Astrophysical Journal
<http://www.journals.uchicago.edu/ApJ>
10. Astroparticle Physics
<http://www.elsevier.nl/locate/astropart>
11. Chinese Astronomy & Astrophysics
<http://www.elsevier.nl/locate/chinastron>
12. Cern Courier
<http://www.cerncourier.com>

13. Computers Today
www.computerstoday.com
14. Dataquest
www.dqindia.com
15. Economic & Political Weekly
<http://epw.org.in>
16. IAU Circulars
<http://cfa-www.harvard.edu/iauc/RecentIAUCs.html>
17. Infrared Physics & Technology
<http://www.elsevier.nl/locate/infrared>
18. Journal of Atmospheric & Solar Terrestrial Physics
<http://www.elsevier.nl/locate/jastp>
19. Journal of Quantitative Spectroscopy & Radiative Transfer
<http://www.elsevier.nl/locate/jqsrt>
20. Monthly Notices of the Royal Astronomical Society
<http://www.blackwell-science.com/mnr/>
21. New Journal of Physics
<http://www.njp.org>
22. New Astronomy Reviews
<http://www.elsevier.nl/locate/newarev>
23. PC Magazine
www.pcmag.com
24. PC Quest
<http://www.pcquest.com>
25. Physica Scripta
www.physica.org
26. Physics of Fluids
<http://www.aip.org/phf>

27. Physics of Plasmas

<http://www.aip.org/pop/>

28. Physical Review A

<http://pra.aps.org/>

29. Physical Review Letters

<http://prl.aps.org/>

30. Planetary & Space Sciences

<http://www.elsevier.nl/locate/planspasci>

31. Plasma Physics & Controlled Fusion

www.iop.org/journals/pp

32. Publications of the Astronomical Society of Australia

<http://www.atnf.csiro.au/pasa/>

33. Publications of the Astronomical Society of Pacific

<http://www.journals.uchicago.edu/PASP/>

34. Reviews of Modern Physics

<http://rmp.aps.org>

35. Science

www.sciencemag.org/

36. SIAM Journal of Applied Mathematics

<http://epubs.siam.org>