ELECTRONIC RESOURCES: HIGHLY USED MEDIA OF SCHOLARLY WORLD IN THE 21ST CENTURY

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Abstract

The paper highlights about the different types of E-Resources and the role of various consortia to access the same in huge amount in lowest price; some discussion about open source and commercial e-resource; requirements for commercial e-resource management and concludes with the future of open source in the open source vs. commercial e-resource battle.

Keywords : E-Resources, Consortia, Open Source, e-Book, ERM.

1 Introduction

E-Resource (Electronic Resource) is a service to help you find E-Databases, E-Journals, E-Magazines, E-Books/Wiki Books/E-Audios/E-Musics, E-News, E-Images, Data/GIS, Digital Library Projects, Electronic Exhibitions, E-Subject Guides, E-Newsletter, E-White Papers, E-Conference Proceedings, E-Reports, E-Studies, E-Interesting Development, E-Directories, Web Search Tools on a range of topic. Many of the resources are freely available to anyone with internet access, but some are licensed (i.e., commercial) resources. I believe that these are important as it could help guide the provision of computer and library facilities for educational institutions. We have relatively simple, but substantial, edifices for print on paper; what provision should be made over the next five years? In turn, this has implications for what academic authors and publishers should, or might, be doing, not just to take advantage of the technology for its own sake, but also to use technology to produce a better educational products.

In India, INDEST (Indian National Digital Library in Engineering Sciences and Technology) was first started on the recommendation made by the Expert Group appointed by the Ministry of Human Resources Development (MHRD) to avail the maximum resources within the limited budget of each and every institution as per their requirements. This has resulted in overall savings of more than 85-90% as compared to print subscriptions by individual universities. The Ministry provides funds required for subscription to electronic resources for 38 institutions including IISc, IITs, NITs, IIMs and few other centrally funded Government institutions through the consortium headquarters set-up in the IIT Delhi. Besides, 60 Government or Government aided engineering colleges and technical departments in universities have joined the consortium with financial support by AICTE (All India Council for Technical Education). Moreover, the INDEST-AICTE Consortium, as an open-ended proposition, welcomes other institutions to join it on their own for sharing benefits it offers in terms of highly discounted rates of subscription and better terms of agreement with the publishers. 502

Institutions have joined the Consortium, under its self-supported category. Total number of member institutions in the consortium has grown up to more than 600.

The following databases are available under INDEST-AICTE Consortia:

Full Text E-Resources

- ABI/Inform Complete
- ACM Digital Library
- ASCE Journals
- ASME Journals (+ AMR)
- ASTM Standards and Journals
- Capitaline
- CRIS INFAC Industrial Information
- Digital Engineering Library (DEL)
- EBSCO Databases
- Elsevier's Science Direct
- Emerald Full-text
- Emerald Management Xtra
- Engineering Science Data Unit (ESDU)
- Euromonitor (GMID)
- IEEE/IEEE Electronic Library Online (IEL)
- Indian Standards
- INSIGHT
- Nature
- Proquest Science (Formerly ASTP)
- Springer Link

Bibliographic Databases

- COMPENDEX on EI Village
- INSPEC on EI Village
- J-Gate Custom Content for Consortia (JCCC)
- MathSciNet
- SciFinder Scholar
- Web of Science

Open Access Resources

- About Open Access
- Open Access E-Journals

- Open Access Directories
- IRs@member Institutions

In order to support the research and academic activity in the country, University Grants Commission (UGC) initiated a programme to provide electronic access over the Internet to scholarly literature in all areas of learning to the university sectors in India. A bouquet of E-Journals was presented to the nation by His Excellency the President of India Dr. A P J Abdul Kalam on 28th December 2003 during the concluding day of UGC's Golden Jubilee celebrations. This programme is wholly funded by the UGC. All universities eligible to receive grants under UGC's purview are the members of the programme, and it will gradually be extended to colleges. The programme is executed by Information and Library Network (INFLIBNET) Centre, Ahmedabad, which is an autonomous institution under the UGC through which access to about 4000 scholarly journals and databases are made available to 100 universities. Access to various E-Journals started from January 1, 2004, however trial access was started much ahead from October – December 2003.

The UGC – Infonet (UGC-Information Network) is an ambitious programme of UGC to interlink all the universities and also extended e-journal services to the colleges as far as practicable in the country with state-of-the-art-technology. The Hon'ble Prime Minister formally inaugurated it on 28th December 2002. The network infrastructure to universities was to be provided on a turnkey basis by ERNET (Education and Research Network) India. Under this programme universities were provided grants to establish the UGC-Infonet connectivity with the support of INFLIBNET and ERNET. The UGC-Infonet E-journal consortium covers all areas of learning, having 48% collections in Science and Technology, 46% collections in Social Sciences and 6% collections in the areas of Humanities.

The following table 1 shows the subject covered and the no. of journals related with the subject (as on March 2005):

Components of E-Resources

1.1 E-Databases

E-Databases (Electronic Databases) include periodical indexes & abstracts (e.g. CAB Abstract, Library and Information Science Abstract (LISA), METADOX (Metal Abstracts), SCOPUS (Abstracting, Indexing and Citation data in Science, Engineering and Technology), WIPS (Worldwide Intellectual Property Search), ACS Archival Access List, ASTM standards, ASTM Journals, Life Science Review Journals, Communication & mass Media, Magillion Literature Plus, Taylor & Francis (List), Directories, Encyclopedias, Dictionaries, and related reference works.

1.2 E-Journals

These are called Electronic Journals. The University users can access more than 50 Library and Information Science (Library Science & Information Science) E-Journals through UGC-Infonet

consortium. There are many Open Source E-Journals are available through Internet, some Library and Information Science Open Source E-Journals and their URLs are given below:

1.	Ariadne:	www.ariadne.ac.uk
2.	Cybermetrics:	www.cindoc.csic.es/cybermetrics
3.	First Monday:	www.firstmonday.org
4.	Information Research:	www.InformationR.net/ir/
5.	Jl. of Digital Information:	www.jodi.ecs.sonton.ac.uk
6.	Jl. of Electronic Publishing:	www.press.unich.edu/jep
7.	Jl. Of Information, Law and Technology:	www.elj.warwick.ac.uk/jilt
8.	D-Lib Magazine:	www.dlib.org
9.	LIBRES**:	www.libres.curtin.edu.au/
10.	PACS-R***:	www.info.lib.uh.edu/pr/pacsrev.html
11.	IFLA:	www.ifla.org

* Library and Information Science Research

** Public Access Computer Systems Review (PACS-R)

1.3 E-Magazines

These are called Electronic Magazines. Magazines can now be in zinio format instead of the hard copy for a price, which is equivalent of the print version.

1.4 E-Books/Wiki Books/E-Audios/E-Music

The term 'e-book' (Electronic Book) includes the hardware, a suitable device to read electronic media, perhaps better called 'e-book reader'. The hardware is important as it provides what readers may need to exploit with the software available and link this to specific requirements. We should include e-audio (electronic audio) here as this needs to be taken with visual and the integration of the two is already taking place with podcasts and vodcasts. A teaching conjecture: an 'e-book reader' with audio so that a student can follow a reading of e.g. Beowulf, see the old English and a modern translation on-screen, and highlight and make notes on either. Perhaps this is already possible[1]. E-audio services (Otis 4 MP3 Players) are available with MP3 (presently MP4) players loaded with audio files with the help of Compaq iPAQ PDA (Personal Digital Assistant). Overdrive is a famous supplier of e-audios. E-book and E-audio services in UK and other developed countries are also available in Public Libraries (e.g. Co-East, Harborough Public Library, and Black Bern with Darwen Borough Libraries etc.). Sound recording collections like Classical Music Library, Naxos

Music Library, and Smithsonian Global Sound are some example of special E-Music (Electronic Music) Library.

The GEB1150 – successor to the Rocket e-book from Gemster was one of the e-book of the first phase (2000-2001). The original e-book was heavier than a standard paperback, although similar in size and shape. It claimed to be portable but was difficult to hold for any length of time, making it cumbersome for people with dexterity problems or certain physical disabilities[6].

PowerPoint presentation itself was, in effect, an e-book. It could be viewed and listened to, synchronously and asynchronously after storage and retrieved from anywhere. Moreover, as an entirely it could be considered as a 'learning object' or a single slide could be used and re-used.

Wiki book is a type of e-book. The writing of such an e-textbook could be done individually or shared easily with other authors and with restrictions on who could make changes, unlike Wikipedia as normally seen. Adding more complex material could be added as a box in the text – although this may also be used to show examples or explanations of related material. For example, in plant morphology book there could be a box about photosynthesis. However, some students might want an explanation or refresher about electron transfer. This could be provided within that 'wiki-book' or even to a quite different wiki-book if that were available. The whole structure could be formulated with such additions included as required. Readability, even on a small e-book reader, might be enhanced. But textbooks are not usually written in this way. Hypertext provides an entirely suitable way of providing this material. The material itself might be left as Open Source with illustrations (as educational objects) being Creative Commons, probably supplied via a DAM system or, more likely, a set of repositories at several institutions.

Looking to the future can be dangerous, via the egg-on-face route, especially with technology. However, the developments suggested here are with us now and e-texts could easily be integrated with comprehensive, although expensive, learning tools such as Tegrity's 'Campus'[10]. This is an institutionally based system linking with a VLE (Virtual Learning Environments). However, I suspect simple Personal Learning Environments (PLEs) will become popular as Web-based applications (spreadsheets, word processors and bibliographic tools) develop for use on Wi-Fi connected e-book readers. Digital, reusable assets will also become increasingly common. Their integration into learning environments, together with some form of e-book (or wikibook), offers a better student experience than 'chalk, talk and a textbook'. Perhaps this integration can be best achieved by information professionals linking skills with academic authors and educational technologists; but I fear that copyright lawyers might not be too far away. Experience does show that inexpensive, easy-to-use tools are taken on with alacrity by the public at large, and that people are prepared to share resources (e.g. Flikr, YouTube). Simplicity of operation may take off educationally. Wilson has described the EBONI Project[11] and it will be interesting to see how some of the techniques she described can be used for the evaluation of wikibooks in their guises.

Downloading books has been possible for some time and the Baen technology and pricing model is almost a standard. Light weight, colour e-book readers will be a variable way of reading and storage and therefore referencing. Further, scribing on e-text will not be a mortal sin[1].

Overdrive, Ebrary, Springer, Wiley, Elsevier, CRC Press, Thomson are some publishers of E-books.

1.5 E-News

E-News (Electronic News) resources like LexisNexis and Factiva, and links to local, national, and international newspapers.

1.6 Data/GIS

Numeric and geo-spatial and other data suitable for those interested in using either statistical or GIS software.

1.7 Digital Library Projects

Through installing any of the digital library software like GNU Eprints/D-Space/Greenstone/OPUS/ DIVA/ARNO/Fedora/CDSWare/iTOR etc. we can access animation, article, book, book chapter, dataset, learning objects, image, image, 3-D, map, musical score, plan or blueprint, preprint, presentation, recording (acoustical), recording (musical), recording (oral), software, technical report, thesis, video, working paper and others.

The seven action points of digital repositories are given below:

i) **Increased visibility by increasing retrievability:** The increased visibility of academic publications is seen as a major factor in the development of digital repositories by the participants of this study. To increase the visibility is to increase the retrievability, which means, among others, accessibility for search engines. Retrievability would be enhanced by better metadata, harmonized subject and/or keyword indexing etc.

ii) **Best practice in the deposit processes:** A simple and user-friendly depositing process is also seen as a major factor. An effort to establish Best Practice for the deposit processes (possibly followed by a harmonization effort) will facilitate an increase in the delivery of content to the digital depositories.

iii) **Mandatory deposit:** A mandatory policy for the deposit of the research output by the institute and – in line with this – requirements by research funding organizations for the deposit of research output in repositories are very desirable in order to maintain and fill their digital repositories. However, institutional mandates are rather controversial, as some expected them to be counter-productive. Clearly, a nuanced approach to effective mandatory policies for institutes and for research funding organizations.

iv) **Flexibility in forms of access:** The situation with regard to copyright of published materials is seen as a major inhibitor to the further development of digital repositories. Many digital repositories have no facilities for allowing other forms of access besides Open Access, such as Open Access with an embargo period. These variations in access forms might help to increase the coverage of published materials, in addition to further advocacy efforts with regard to the copyright policies of publishers. Again such an approach, without watering down the Open Access vision, could be worked out.

v) **Awareness and interest among academics and decision-makers at research institutes:** Other important goals for advocacy efforts, as seen from the perspective of this study, should be to create interest from decision-makers and to stimulate or support awareness campaigns among academics.

vi) **Development of services:** With regard to other possible services on top of the digital repositories, priority should be given – apart from the earlier-mentioned journal and thematic search engines – to citation index services and preservation services.

vii) **Development of further technical standards and a possible close collaboration between the various software solutions:** The need for technical harmonization by the development of common standards is also evident from the large number of software packages in use by the various digital repositories. For the development of new services on top of the digital repositories, adherence to agreed standards and possibility close collaboration between various software developers is seen as crucial to the development of services on top of the digital repositories[4].

2. Open Source/Access E-Resource and Commercial E-Resource

Open source/access is a software/E-Resource whose source code and binary version both is available through internet. It is then perhaps something of a paradox that the Open Access debate has made much less marked progress in the last decade.
A decade ago Joshua Lederberg[7], the eminent scientist and Nobel prize-winner talked of the change in technology at a UNESCO sponsored meeting and said:

"Now what are some of the foreseeable consequences? I really have nothing to ask of the print publishers or of the "for profit" electronic purveyors. Unless they are very selective – and they sometimes will be – about their value added, they will fail of their own weight as scientists become empowered to manage their own communications without the benefit of intermediaries".

Commercial E-Resource is the e-resource, which is available through subscription from the existing commercial unit. Through consortium the research and educational institution can access this type of journal in a very lower price.

This simply has not happened to mainstream science. Although Swan's work[9] has demonstrated the willingness of researchers to deposit articles in repositories, this has tended to be a passive rather than an active agreement, judging by the thin population of most institutional repositories. Open Access journals have also grown in numbers. In November 2005, the Directory of Open Access Journals[5] lists almost 1900 open access journals. But open access is a long way from being at the heart of scholarly communication and is ranged against large commercial forces in the STM (Scientific, Technical and Medical) publishing area; and although optimists will feel that the tide has turned on Open Access and that moves such as the much heralded but still awaited Research Councils' mandating of deposit will tip the balance, it has to be acknowledged that the UK scientific community looks more like donkeys led by the lions (to paraphrase Max Hoffmann) than the reverse. The community looks remarkably unmoved by considerations of the future of scholarly communication. And yet it is common ground between at least some publishers and some proponents of open access that the present model is disintegrating and cannot survive[2]. It can be argued that the position in the UK is skewed by the Research Assessment Exercise (RAE). If that is the case it hardly affects what is a global problem and in any case should be self-correcting in two years time when the RAE is over. In sum then Open Access has made good progress (although as the mailing lists show there remains substantial confusion between the green and gold routes, between Open Access and Open Archives), but commercial STM publishing remains in rude and profitable health. And in an expanding market of scientific communication the commercial sector also continues to grow.

3. Commercial Electronic Resource Management (ERM)

Public and academic libraries are subscribing to an ever-increasing number of electronic resources. Managing the licenses for that many databases manually is a major headache – enough of a headache that a number of libraries have created databases to manage their licenses. While that has improved control over the licenses, it has increased the amount of duplication in data entry as yet one more system is implemented.

A few libraries have turned to the vendor of their automated library system for a "turnkey" solution. Among the first of these was the University of Washington Library. It asked Innovative Interfaces for an ERM product. The automated library system vendor is a logical supplier of an ERM product because many of features of such a product are inherent in the technical services modules of an automated library system and much of the information about the databases is in the library portal that is now part of many systems. There are almost no mid-size and large public and academic libraries that do not have a system supplied by Dynix, Endeavor, Ex Libris, Gaylord, Geac, Innovative, Sirsi, TLC, or VTLS.

3.1 Requirements

There appears to be consensus that the following information is required for good management of electronic resources:

3.1.1 Database Name

The database name should be that on the license, but variants of the name, including the name of the print version, if any, should be included.

3.1.2 Content

A description of the content should include the database breadth and length of coverage. The extent of the backfile that is available, but not included in the license, should be identified.

3.1.3 Producer, Licensor, and Aggregator

The producer of the database should be identified, as should the licensor and aggregator. For example, ABI Inform is licensed by ProQuest, but it is accessed through OCLC. Thus, the aggregator is the provider, rather than the producer or the licensor.

3.1.3 Packaging

Databases that come from a single source may be combined in packages. Journal titles from multiple sources are also frequently packaged. A library needs to be able to access records by either the database name or the package of which it is a part. As packages, especially packages of journal titles, can have a great number of resources, it is important that it be possible to import information from external sources that itemize package content.

3.1.5 License Duration and Renewal Alert

The beginning and ending dates of the license need to be included, and there should be a renewal alert a fixed number of days prior to expiration. Ninety days is the minimum.

3.1.6 Copy of Contract

An electronic copy of the contract with the vendor should be part of the record. A machine-searchable version that can be searched by keyword is better than a PDF.

3.1.7 Price and Payment Terms

The subscription price or per-view price should be included, along with the payment schedule. The basis for the pricing should be included: a site license for the entire library, site licenses for each location, population-based pricing, budget-based pricing, tie-in with a print subscription, etc.

3.1.8 Payment History

Payment dates, amounts, invoice numbers, and voucher or check numbers should be part of the record. Libraries also need to be able to record internal fund code data so that databases can be properly charged to the appropriate units from year to year.

3.1.9 Access Method(s and Resource Link)

The access method(s) should be spelled out, and the URL should be included.
Separate URLs or a URL and a referring URL and access method descriptions may be needed for resources accessed both locally and remotely.

3.1.10 Access Restrictions

Is anyone in the library able to access the database from a workstation with a registered IP address or through a server? Are remote users who have library ID numbers able to access the database? It may be necessary to have a field where IP addresses for servers or individual authorized in-library units can be listed.

Since vendors and libraries sometimes share authentication responsibilities, it is important to indicate all of the authentication methods in use for the database. These might include local users by IP address, remote users authenticated by the vendor using patron barcode number, or remote users authenticated by the library using patron barcode number.

3.1.11 Vendor Contacts

Names, addresses, phone numbers, and e-mail addresses of sales, customer service and technical support contacts should be listed, with fields to add names for each category as necessary.

3.1.12 Contact History

All contacts regarding a database or the license should be recorded, including date, issue, and resolution.

3.1.13 Use Statistics

Use statistics should be available, possibly in a separate vendor statistics site. Among the statistics it is reasonable to expect are the number of sessions, searches, hits, page views, length of connection time, searches per resource, items viewed, items printed, items e-mailed, etc.

3.1.14 Cost Per Use

A library should be able to determine the cost per use for subscription databases by dividing the annual subscription price by the number of views or, if preferred, the number of items printed or e-mailed. Database providers and aggregators do not provide this information, but they should provide a way of importing the use and cost data into the ERM record. While cost per use calculated on the basis of number of views does not indicate whether the database was useful, it does help to identify expensive databases.

3.1.15 Who Sees What

The person(s) responsible for managing the contracts for electronic resources must have access to all of the foregoing information, but parts of the information should be available to others. Public services staff and patrons should be able to see journal holdings statements, access URLs, printing

permissions, interlibrary loan policies, and other information that will help them access electronic resources. Multiple layers of security should be provided through pass wording.

3.1.16 Offerings of Automated Library System Vendors

As of mid-February 2004, only Innovative Interfaces had completed an ERM product and installed it at a number of libraries. Provision is made for all of the data elements previously itemized except use statistics and cost per use.

The University of Washington Library was Innovative's first ERM customer. Others include Washington State University, Ohio State University, University of Arizona, CISTI of Canada, National Institutes of Health, Oregon Health Sciences, and University of Nevada at Reno, University of California/San Diego, and Glasgow University. Two libraries that do not have Innovative's automated library system have contracted to purchase standalone systems from Innovative: Utah State University and the Library of Congress. [The latter announced its decision at the American Library Association Midwinter Meeting on January 10, 2004].

VTLS had completed development of its ERM product in mid-February of 2004, but it had not yet demonstrated it publicly. Provision is made for all of the data elements previously itemized except use statistics and cost per use. When the product is introduced, it will be known as VERIFY (Vtls Electronic Resource Information and Funding utility).

Dynix, Endeavor, Ex Libris, and Sirsi were all developing ERM products in early 2004, but none expected general release before the fourth quarter of 2004.
GIS Information Systems responded to an inquiry in December 2003 that it was not actively developing an ERM product because it felt that demand would be primarily by academic libraries, a market sector on which it does not focus. TLC did not respond.

Even at this early stage in the development of ERM products, it is clear that it will be difficult to match up the products offered by automated library system vendors. While Innovative and VTLS have created products that can be used standalone or integrated with their automated library systems, some vendors intend to build on their portal products to achieve greater integration. That will make it difficult for a library that already has a portal from a different source to consider them.

3.1.17 ERM Product Pricing

Most of the vendors that have developed, or are developing, ERM products have not yet firmed up pricing. What information is available suggests that the minimum price will be Rs.8, 40,000/- to Rs.12, 60,000/-. The size of the library or the number of licenses to be controlled will probably determine how much higher the prices may go.

3.1.18 Alternatives to Vendors of Automated Library System

The Colorado Alliance also offers features that help with e-journal management tasks for the more than 40,000 unique titles in 525 databases and e-journal packages available through it.

Some of the libraries that have developed their own electronic resource management tools may be willing to share the fruits of their efforts.

3.2 Requirements Development

Libraries that are developing requirements for an ERM product should consult the report of the DLF Electronic Resources Management Initiatives[3].

4. Conclusion

Open Access is a battle where a ragamuffin band of academics and librarians are challenging the imperial pomp of billion dollar global companies. In those terms the contest is both unequal and unwinnable, since too much inertia is built into the system. There are powerful drivers and changed agents in place – technology; the nature of research; Google; national interest – which coupled with the sheer bloody-mindedness and persistence of the proponents of open access will lead to its growth as the dominant form of scholarly discourse.

Predicting the future is a hopeless task, but perhaps a necessary one. Mitchell (2002) experiences with futures research concerning the digital divide. He explained that when considering this 'it becomes obvious that neither the past nor the future actually exists; only memories, projections, and perceptions exist. However, both the past and the future guide current action. When blended with the topics of social change and leadership, the value of futures research emerges as an absolute imperative. Without the ability to plan, project, and forecast, the ability to prepare for the future is hopeless. However, without hope, there is no future'.

On the other hand, one can perhaps do no better than heed Winston Churchill's words that a good politician should have the ability to foretell what is going to happen next week, next month and next year. And afterwards to explain why it did not happen.

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