
ACCESS TO SCHOLARLY LITERATURE IN HIGHER EDUCATION INSTITUTIONS UNDER INFLIBNET CONSORTIUM

PREM CHAND

K PRAKASH

THIYAM SATYABATI

SURESH K CHAUHAN

Abstract

The escalating price of electronic journals, Indexing and abstracting databases along with traditionally published print subscriptions has forced library community to explore alternative means of subscription. The consortia based subscription is perhaps a solution for subscription of peer-reviewed journals. In India, during last five years we have witnessed many consortia based subscription, ranging from subject specific to institution specific. The advancement of Internet and telecommunication has made it possible to subscribe network based resources to the users. The paper describes about the initiative taken by INFLIBNET in this direction and highlights the importance of current trends of usage statistics of networked resources of various publishers. Further the authors describe the patterns of electronic journal usage by the members of UGC-Infonet Digital library consortium during the last three years.

Keywords: Library Consortium/ E-journals/ COUNTER/ Usage statistics Higher Education India/ Library Networking/ INFLIBNET/ UGC-INFONET

1 Introduction

After the advent of Internet, e-publishing industry has flourished in an explosive way and large numbers of e- resources were available through Internet. Couple of years back the average journal subscription base was around 250 in Indian Universities. Even the best libraries in the country could not subscribe to journals required by their users. In small universities access and subscription of peer reviewed foreign journals was almost nil, The situation was critical for teaching, research and development work in universities. The launch of UGC-Infonet E-Journal Consortium in 2004 has changed the entire situation and enriched the resource base of university libraries. University libraries in India have access to large number of scholarly journals from major foreign publishers for the last three years. The INFLIBNET, through UGC-Infonet E-Journals programme, has been facilitating e-resources access to more than hundred universities

covering all corners of the country ranging from remote locations of Northeast and Jammu & Kashmir to universities located at metros and major cities. Thus this ambitious programme has bridged the digital divide and introduced e-journals, free of cost in university libraries.

2 Higher Education in India

The Indian education system is the second largest in the world and is perhaps the most complex in terms of its spatial outreach and profile of students and teachers in terms of their linguistic, social, cultural and economic background. It consists about 339 universities and about 17,500 affiliated colleges where millions of students enroll for higher education. The number of state and central universities rose from 133 (at the end of the Ninth Plan) to 206 at the time of 10th Plan (up to March 2005) and 339 during 10th Five Year Plan (up to December, 2006). University Grants Commission (UGC), Professional Councils, Central Government, and State Governments are playing major roles in enhancing the quality of higher education in the country. The UGC is responsible for coordination, determination and maintenance of standards and release of the grants to the universities and colleges. Professional councils are responsible for recognition of courses, promotion of professional institutions and providing grants to undergraduate programmes and various awards.

In spite of various active bodies and government programmes to promote the higher education in the country, where 35% of India population in the age group of 20-25 aspire for higher education, only 9% - 10% enrolled in the system as against 75%- 85 % in the Developed countries. The total enrolment of students in 2005 was 92.3 lakh as compare to previously 75 lakh (in 2004) and now in 2006, it touched 10.5 million approximately. In terms of allocation of grants, the government has allocated Rs 4,176 crore in the 10th Five Year Plan for the growth of higher education system in India, which is a 67% increase, from the budget (Rs 2,500 crore) allocated in the 9th Five Year Plan. As per GDP spending on higher education in the country has remained stagnant at around 0.37% against 1.41% of US, 1.07% of UK and 0.50% of China. India attracts 15,000 to 18,000 foreign students every year whereas China magnetize more than 1,40,000 students, even Singapore and Malaysia attract over 70,000 and 30,000 foreign students respectively for their higher education each year. The statistics demonstrate that India is lagging behind in attracting foreign students in various universities of India.

Keeping in view the presence of young population in the country, ranging age group 20-25, and looking at the demographic profile of developed nation and shrinking proportion of their workforce, India has advantage of becoming knowledge hub. Government of India has constituted the National Knowledge Commission to seek new ideas on how we can modernize and expand our educational institutions and make them world class. Knowledge Commission has suggested for setting up of 1,500 universities by 2015, national missions for translation and libraries, and greater e-networking between institutions positive which is a healthy sign for the academic system. Realizing the importance of libraries for knowledge economy, it has also suggested the government

to constitute a National Commission on Libraries. Mr. Sam Pitroda, Chairman, NKC has suggested to set up an Indian Institute of Library and Information Science to boost the research and development of library system in the country.

Despite of the best efforts by the government, we still need more number of universities, better infrastructure, quality labs and world-class Digital libraries to compete with rest of the world. Universities should have access to world wide literature, research reports, reviews, databases, full text journals which will boost research in the country and produce more Nobel laureate in various fields from the country.

Teaching and research are both integral part to create excellent institutions of higher education. We need to improve infrastructure in universities with sufficient grant and resources for students, teachers and research scholars. ICT should be an integral part of teaching and learning in universities. Technology has greater role to play in establishing of excellence. Campuses of institute of higher learning should be ICT enabled, fully networked with digital classrooms, facility to access digital resources, peer reviewed journals from across the globe, and video conferencing lecture theaters. Students should have access to world literature sitting at the libraries or classrooms. There must be adequate bandwidth for Internet and Internet application in the campus, sufficient fiber optics nodes should be provided with access points with deployment of Wi-Fi.

In last three years UGC has taken certain steps to improve the Network infrastructure and access to scholarly journals to all universities which is described in later part of this paper. Still we have long way to go and extend these facilities to remaining universities and colleges which needs additional grants. For XI plan, INFLIBNET has prepared comprehensive document to cover networking facility to all the universities and facilitate scholarly journals to entire universities and colleges

3 Role of INFLIBNET

INFLIBNET (Information and Library Network Centre) was established to create and establish campus wide networking with state -of -the -art - information and communication technology and to help the users to access the knowledge world in cyber space. It is an autonomous body of University Grants Commission, located at Ahmedabad. In last one decade Centre has achieved many milestones especially in the area of content development and information delivery, software development (SOUL), establishment of network infrastructure, human resource development and access to networked resources to the academic community in India. The Centre has introduced IT culture in university libraries and played pivotal role in building networking infrastructure in the libraries. It has also organized specialized training programmes for working library professionals. Recently launched two major national programmes, viz. UGC- INFONET, which connects universities through network, and Digital Library Consortium are major initiatives which have been successfully implemented and made imprint in the country.

3.1 Network Infrastructure in universities: UGC-INFONET

Higher education requires substantial bandwidth to support collaboration, information sharing, more effective teaching and learning, and wider accessibility to educational opportunities. In order to bring quality in higher education, INFLIBNET, under the guidance of University Grants Commission (UGC) has taken major initiative to modernize the university campuses with the state-of-the-art campus wide networks and has set up its own nationwide communication network called UGC-Infonet. It is an ambitious programme to bring about a qualitative change in the academic infrastructure, especially for higher education and to make use of the benefits of Information and Communication Technology to all the universities and colleges across the country. The UGC-Infonet is supporting faculty, students, and staff in the best uses of technology to expand teaching, learning, research, and scholarship. It is creating opportunities to realize greater transfer of new ideas and developments with other institutions who are working for national development.

In order to establish a network for such a big country with different geographical location, UGC has constituted a national committee for smooth implementation and execution of this gigantic task. It is known as Central Connectivity Monitoring Committee (CCMC). The committee has chosen ERNET India to establish network in universities, which is pioneering organisation for providing and establishing network to educational and research institution in the country. The committee has recommended high bandwidth campus network connecting the university externally to the world and internally across the campuses, faculty, staff, and students reach daily into the digital world. The UGC-Infonet is using the backbone of ERNET network, which is a judicious mix of terrestrial and satellite-based wide area network. The Satellite Wide Area Network (SATWAN), using C-Band transponder on INSAT-3C and VSAT technology has facilitated reliable and quick access from remote areas. The SATWAN hub, located at STPI Bangalore, supports broadband VSATs with up to 52.5 Mbps shared bandwidth and Single Carrier Per Channel (SCPC) VSATs capable of providing up to 2 Mbps dedicated bandwidth.

As of now 149 universities have been provided connectivity depending upon needs of the university. It ranges from 512 KBPS to 2 mbps raw bandwidth. Where terrestrial link is not possible, satellite based network (VSAT) has been provided. INFLIBNET is paying bandwidth cost of all universities. It is also administering entire programme including monitoring of bandwidth utilization and releasing the annual recurring cost of 149 universities. In 2005-06, INFLIBNET has paid recurring cost of Rs 1190.02 lakh on behalf of member universities.

3.2 UGC- INFONET Digital Library Consortium

The escalating price of the rapidly growing numbers of electronic journals, databases, indexes and abstracting databases and shrinking budget of libraries for last few years is common phenomena throughout the world. The increasing costs of the dual format both print and electronic journals have forced libraries to discontinue the subscription of journals. Libraries have explored various alternative models of subscription and consortia based subscription is the right answer to provide access to peer reviewed journals.

UGC has launched UGC Infonet E-journal consortium in 2004, which is now known as UGC- INFONET Digital Library Consortium and it is perhaps worlds largest, unique and successful consortia, catering to the needs of millions of users. It is initiative to use ICT in universities to support teaching and research. Under the consortium INFLIBNET is providing electronic access to 4500+ full text electronic journals across a wide range of disciplines for a price that is less than the original subscription cost. The electronic resources under the consortium are easily accessible online for member universities. These electronic resources can be downloaded from various locations. The virtual library concept and the 24-hour accessibility of the electronic resources have made users increasingly satisfied and reliant upon the electronic journals. Currently there are over 100 universities covered under paid consortium besides 20 universities are accessing various resources as complimentary access.

Electronic journals are an increasingly critical part of library collections. Acquiring e-Journal contents involves more complex processes than buying the print form. It involves understanding of product information, licensee / agreement and negotiation with the publishers. The National Negotiation Committee of consortium has effectively negotiated with 25 various e-resource providers/ aggregators. The consortia model got the discount of 85% to 90% percent of list price. For example, one interesting price model is for subscription of JSTOR collection. INFLIBNET is paying only 4 percent of the price compare to what Harvard University is paying for subscription of J-STOR. The J-STOR is highly used by the consortium users in particular users from social sciences and humanities background. Under the consortium during the last three years INFLIBNET has spent Rupees 16.91 crores in 2004; 25.9 crores in 2005 and in 2006 Rupees 28.47 crores, for subscription to e-resources to more than 100 universities.

3.3 Resources covered under Consortia

The major resources covered under the consortia are Journals published by American Chemical Society, American Institute of Physics/American Physical Society, Institute of Physics, Annual reviews, Blackwell Synergy, Cambridge University Press, Scifinder (CAS) Elsevier Science (34 titles of Cell Press and Current Opinions and Trends), Emerald (Library Science), Nature, Oxford University Press, Portland Press, Project Euclid, Project Muse, Royal Society of Chemistry SpringerLink, Taylor and Francis, BIOSIS, MathSciNet and Encyclopedia Britannica etc. Thus subscription covered all areas of learning like Science, Technology, Medicine, Social Sciences and Humanities.

4. Usage Statistics

Usage statistics is an important parameter to determine the value of e-resources and can be used to find out current trend of over all usage of subscribed resources. In the traditional, print publishing environment, usage of journals held in the library was difficult to measure systematically. The usage statistics were either not available, or were insufficiently reliable to form a basis for decisions to renew the subscription or judge the value of journals in terms of users perspective. In online publishing environment, it is not only possible to measure usage in a systematic way; it is desirable

to do so, for the central agency (INFLIBNET), responsible for implementation of a consortium.

Most of the e-resources available for users are served from the publisher's server, maintained and controlled by the publishers, aggregator and vendors. They control the data. Some publishers, vendors, aggregators reluctant to provide the right to generate e-resources usage data because in case of low usage, subscribers may use the data as basic criteria for renewal of subscription. In such cases, subscriber has to rely upon vendor which may not provide reliable and authentic usage reports. Different practices are being used by different publishers to generate usage statistics of electronic resources. The best option is to provide the privileges to the subscriber or the agency, which is responsible for implementation of consortium, to extract the data from the approved system. This is more reliable, authentic and credible way to get the usage statistics. These usage statistics have to satisfy the "Three C"s. First, they must be credible, consistent, and compatible. This has resulted in Project COUNTER (Counting Online Usage of NeTworked Electronic Resources), now the leading initiative in the field. The COUNTER compliance' usage can be generated by the subscriber of online resources. more details of the counter can be read from <http://www.projectcounter.org/about.html>

By complying with the COUNTER Code of Practice publishers and intermediaries will be able to provide data to their customers in a format they actually want and learn more about genuine usage patterns.

COUNTER complaint generated usage statistics can be used for following :

- Budgeting and Decision making for a agency who is involved in implementing of consortia.
- Gain more accurate national picture of use of electronic resources
- It is reliable, authentic and less chance of tempering of data
- Better and effective negotiation with the vendors for different E-resources
- Identifies current trend of high and low usage which can be used to take remedial measure where usage is low.
- Identify the most popular as well as less used journals
- Determine cost of article per download
- New pricing models for the subscription/renewal of online products.
- Compare usage with member libraries and support where usage is low.

5. Cost per download

In aiming to show, how much benefit can be gained from in depth study of usage, I worked out download of cost per articles. We took usage statistics of member libraries

from 14 major publisher and analyzed. It is an important factor in decision-making and user support. INFLIBNET, the nodal agency for implementation of the consortium, has been getting robust quantitative data about levels of use of e-resources and to it is analyzing how far their investment in subscription of E-journals collections represents value for money for consortium members.

An attempt has been made to understand the cost per download based on the actual usage and actual amount spent by INFLIBNET for subscription of major publisher's content during the last two years. The cost per download for each publisher shows that there is considerable amount of downloads from major publishers.

It is observed that there is significant upward trends of overall usage and cost per download have come down. Our aim is to bring it down further, at the level of one USD per article. It is possible once bandwidth of universities increase to 2 mbps, which has already been recommended by Central Connectivity Monitoring Committee (CCMC).

Table 1 : Cost of per article downloaded by member of UGC-Infonet Digital Library Consortium for the year or 2005 & 2006 (Cost is in USD)

Sl. No.	Publishers	Cost per download (2005)	Cost per download (2006)
1	Jstor	4.29	0.54
2	Elsevier	3.35	4.31
3	Taylor and Francis	1.71	1.32
4	ACS	1.28	1.33
5	AIP/APS	1.53	1.67
6	Oxford University Press	1.53	0.64
7	Blackwell	2.4	2.07
8	Nature	1.74	2.17
9	Annual Reviews	2.82	2.25
10	Emerald	5.15	2.74
11	SpringerLink	4.29	3.83
12	Royal Chemistry of Society	9.24	5.13
13	Project Muse	7.25	8.03
14	Institute of Physics	4.38	4.42
	Average	3.64 \$	2.8 \$

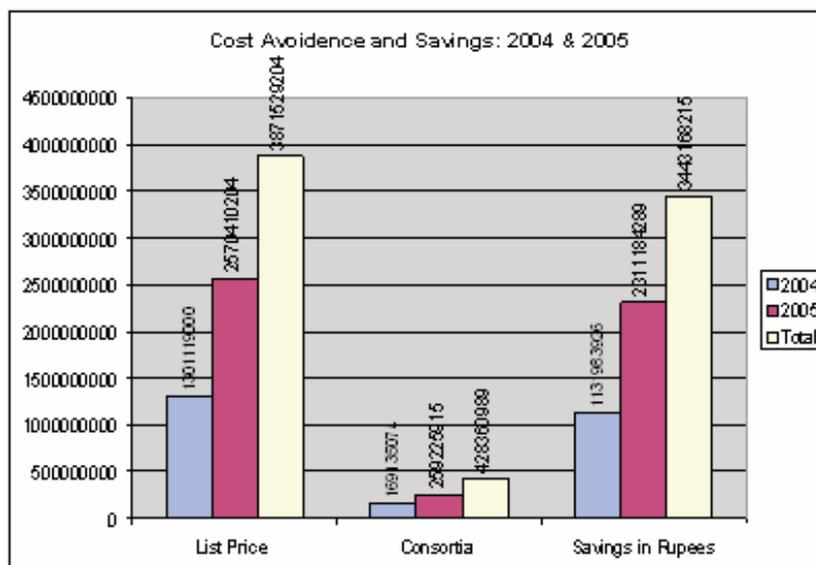
The table 1, shows that average cost of article for the consortia is 2.9 USD against 35 to 40 USD for article under document delivery service offered by international DDS agents. In many cases it is less than 2 USD which demonstrates that National steering Committee of UGC- INONET Digital Library Consortia has effectively and efficiently negotiated with various vendors. We consider 4 USD per article is high and planned to initiate necessary intensive training programme involving concerned publishers.

6. Cost Avoidance

Savings under UGC-infonet Digital Library Consortium is calculated in terms of difference between cost paid by the consortium for member institutions for e-resources and cost payable by individual universities in case they subscribed the resources on their own. The table given below depicts that there is a savings to the national exchequer a saving of Rs. 113.20 crores in 2004 and Rs. 228 crores during 2005 with overall figure of Rs. 345 crores approx. considering the fact that the same resources on list price would have cost Rs. 130.11 crores and 257 as against Rs. 16.91 crores and 25.92 crores for the year 2004 and 2005 respectively.

Cost Avoidance: List Price V/s Consortium Price for the year 2004-2006

Year	No. of Publishers	No of Univ.	List Price in Rupees	Consortia Price in Rupees	Savings in Rupees
2004	16	50	130,11,19,000	16,91,35,074	113,19,83,926
2005	25	100	257,04,10,204	25,92,25,915	231,11,84,289
Total:			387,15,29,204	42,83,60,989	344,31,68,215



7. Current trend of usage

INFLIBNET has introduced access to e-resources from sixteen major publishers which includes full text journals, indexing and abstracting databases and gateway portals in 2004. Besides subscription of e-resources for university libraries, INFLIBNET has

introduced ICT in universities, provided substantial grant for establishing networking and cost of annual bandwidth utilization. It has transformed the teaching and learning method and will definitely enhance research output in the country. Librarians ought to play major role in delivering information to users and embrace information technology in libraries. Users need to adopt, accept and aware of e-resources and learning environment. It is evident from the available usage of last three years the usage trend has been increased manifold. It needs further momentum in coming years to make user aware of the resources.

Usage in 2004: Fifty universities were given access to 16 publishers content and 879625 full text articles were downloaded.

Usage in 2005: In 2005 resource base has been expanded and number of universities has also been increased. Consortia offered e-resources from 25 major publishers/ vendor aggregators content to hundred universities. Usage has increased manifold and consortia members have downloaded 2945074 full text articles in 2005.

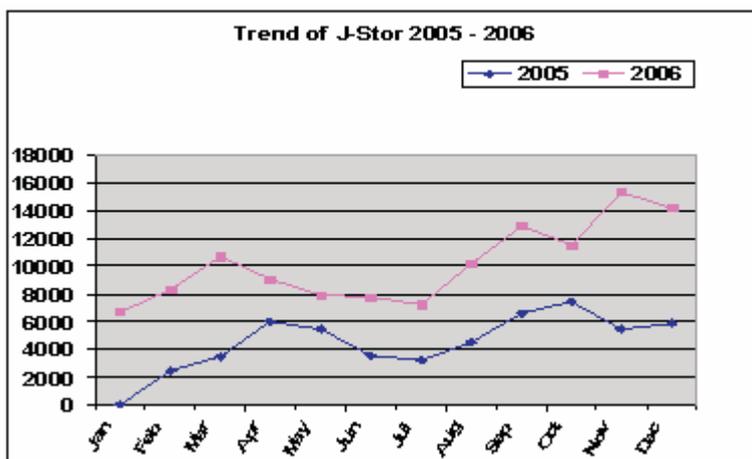
The increased value of e-journals subscribed under consortia is evident from the over all usage trends as shown in following figures. E-journals are used more frequently than previous two years. It is certainly true that the usage statistics provided by publishers such as Emerald, Jstor, Royal Chemistry of Society, SpringerLink, Taylor and Francis, Annual Reviews, Oxford University Press and American Institute of Physics/ American Physical Society has increased manifold. Following table shows the increased in percentage.

SR. No	Publishers	Total no. of downloads 2005	Total no. of downloads 2006	Increase in %
1	Emerald	18106	43174	58.06
2	Jstor	53924	121745	55.7
3	RSC	41786	88164	52.6
4	OUP	100316	158096	36.54
5	SpringerLink	190831	273319	30.18
6	T&F	145980	201602	27.59
7	Annual Review	56504	76492	26.13
8	AIP/APS	243856	310208	21.39
9	IOP	81071	90751	10.62
10	ACS	422816	432739	2.29
Total Download Increase for above products				30.7

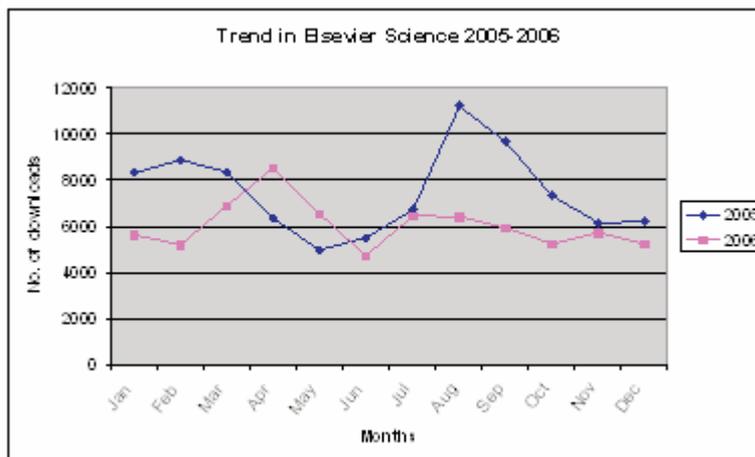
7.1 Publisher-wise usage trends in the last two years

The following graphs show usage trends for various publishers during the year 2005 and 2006.

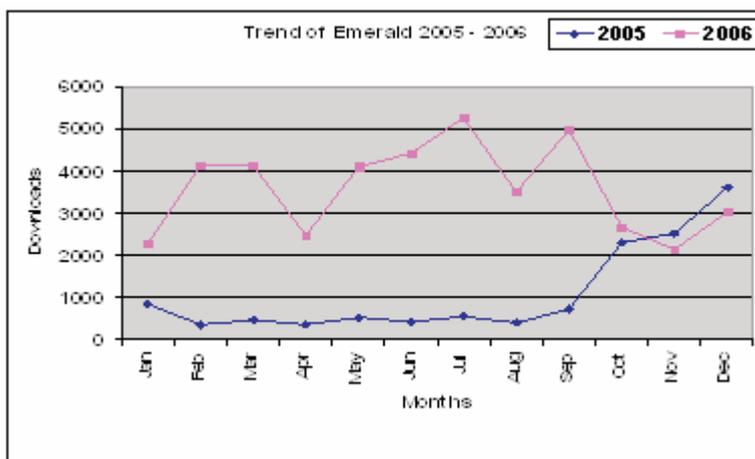
J-stor: is an online system for archiving academic journals. It provides full-text searches of digitized back issues of several hundred well known journals, dating back to 1665. The basic idea was to convert the back issues of paper journals into electronic formats that would allow savings in space while simultaneously improving access to the journal content. Access has been given to 24 universities in the year 2005 and 10 more universities are added in 2006. Now the consortia have altogether 34 universities accessing these journals.



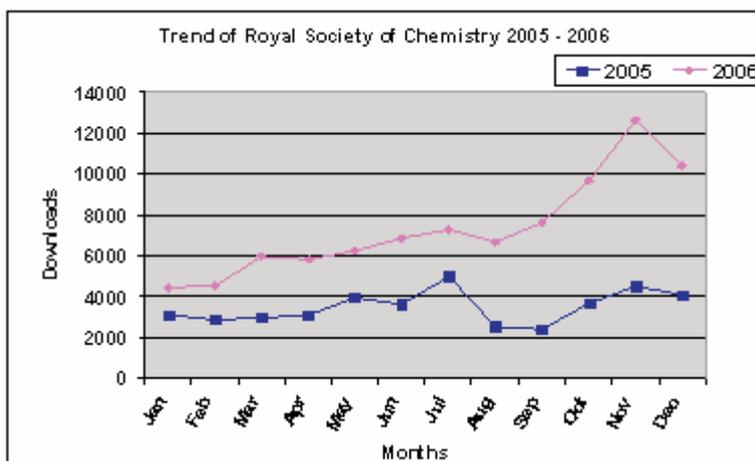
Elsevier is one of the leading publishers of science and health information, It serves more than 30 million Scientists, students, and health and information professionals worldwide. The consortium has been subscription to this product for 50 universities (30+20) from 2004 onward.



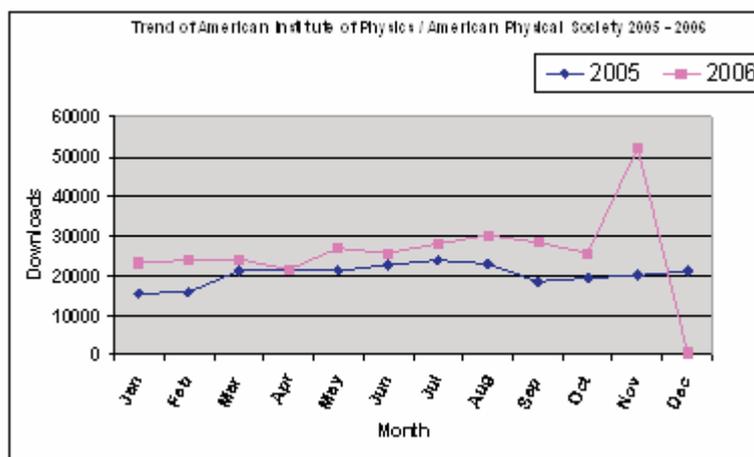
Emerald is a leading publisher of academic and professional literature in management, library services and engineering. The consortium has been subscribing this to 30 universities in the year 2004 and 50 Universities (30+20) in the year 2005 and from 2006 additional 16 universities are also given complimentary access. Emerald's flagship product Emerald Management Xtra, a comprehensive resource is also being provided as a complimentary access to the consortium members.



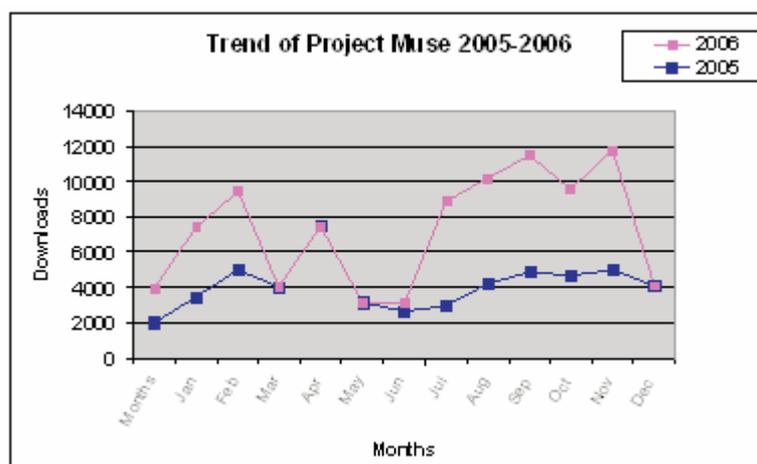
Royal Society of Chemistry: The largest and most dynamic publishers of chemical science information in the world. The publishing activity dates back to 1841 and they publish a wide range of journals, magazines, databases and books. The consortium has extended the access to its products to 100 universities from 2005.



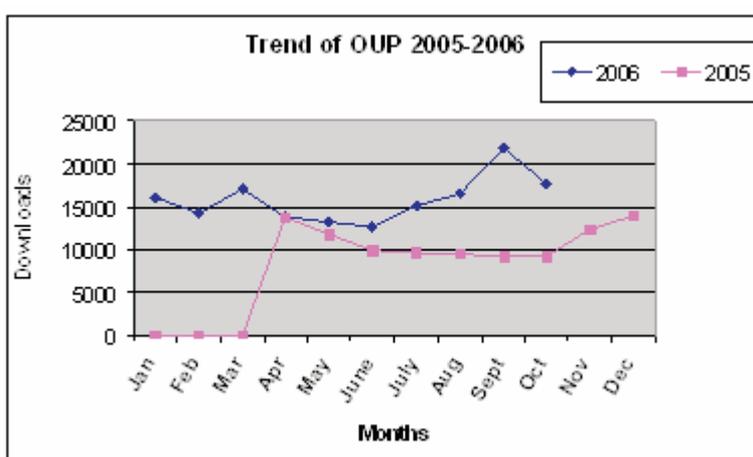
American Institute of Physics/American Physical Society (AIP/APS): It promotes the advancement and diffusion of the knowledge of physics and its application to human welfare. The mission of the Institute to serve physics, astronomy, and related fields of science and technology by serving its member societies and their associates, individual scientists, educators, R&D leaders, and the general public with programs, services and publications - Information that matters. Access has been provided to 100 universities. The graph shows that there is an increase in usage in 2006 but surprisingly in the month of December the usage decrease drastically.



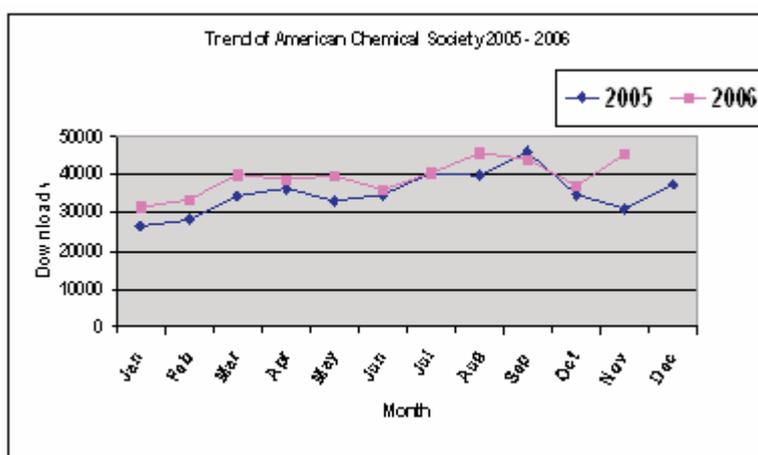
Project MUSE is a unique collaboration between libraries and publishers providing 100% full-text, affordable and user-friendly online access to over 300 high quality humanities, arts, and social sciences journals from 60 scholarly publishers. The consortium has been subscribing for 100 universities. The Graph shows that there is a decrease in the download in the month of May and June. This is because the access has been stopped due to the non-release of payment.



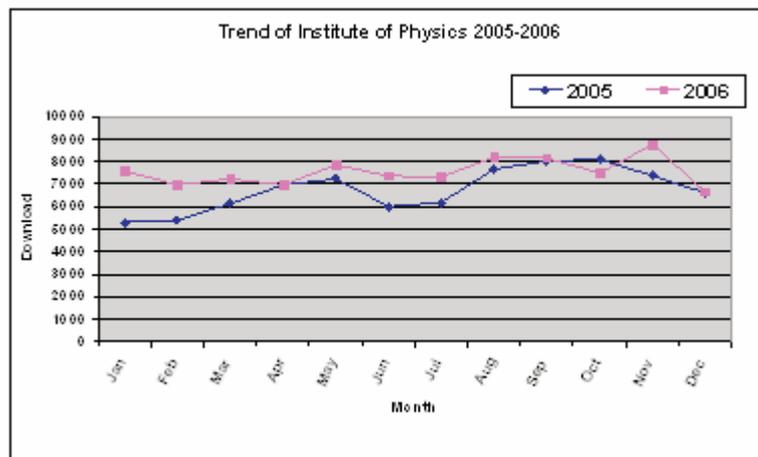
Oxford University Press: It is a major international publisher of academic and research journals, publishing over 180 titles, many in partnership with the world's leading prestigious learned societies. The collections cover Life Sciences, Mathematics & Physical Sciences, Medicine, Social Sciences, Humanities, and Law, and include some of the most authoritative journals in their fields. The consortium has been subscribing to 50 universities and 50 more universities are accessing the resources under complimentary access. The consortium has started its subscription from April 2005 onward. While writing paper, usage statistics of OUP journals are available up to October only



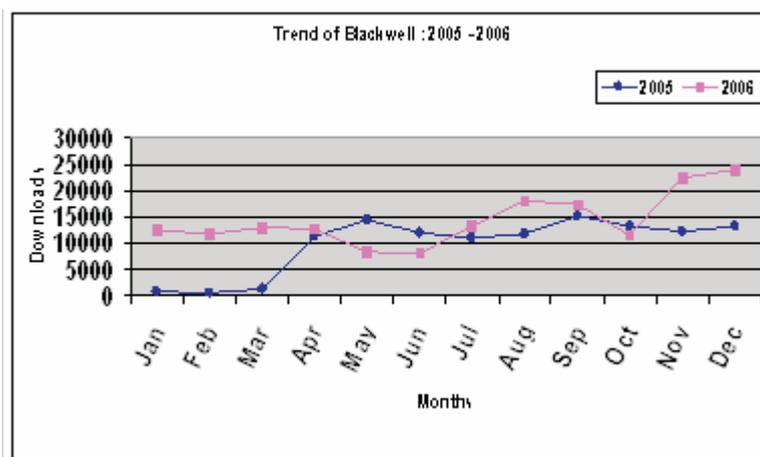
American Chemical Society: ACS Publications is the leading publisher of peer-reviewed research in the chemical and related sciences, serving scientific communities worldwide. The consortium has given access its full collection (including back volumes) to 100 universities.



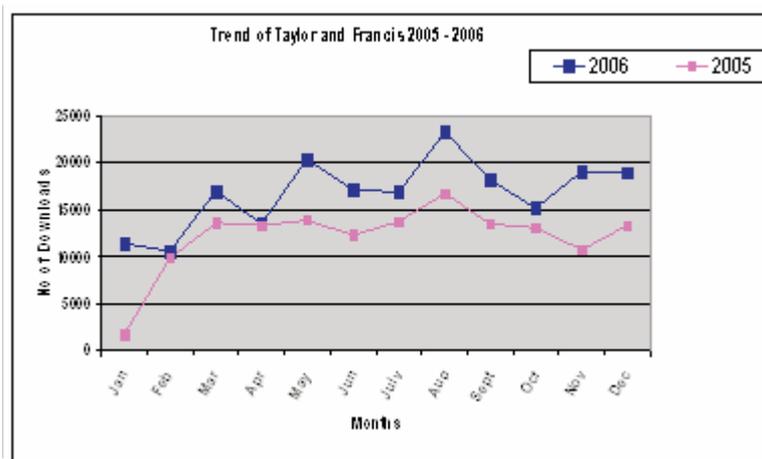
Institute of Physics: The Institute of Physics is a scientific membership organization devoted to increasing the understanding and application of physics. It has an extensive worldwide membership and is a leading communicator of physics with all audiences from specialists through government to the general public. Under the consortium the resources has been given access to 100 universities and 16 additional universities has been given complimentary access in the year 2006.



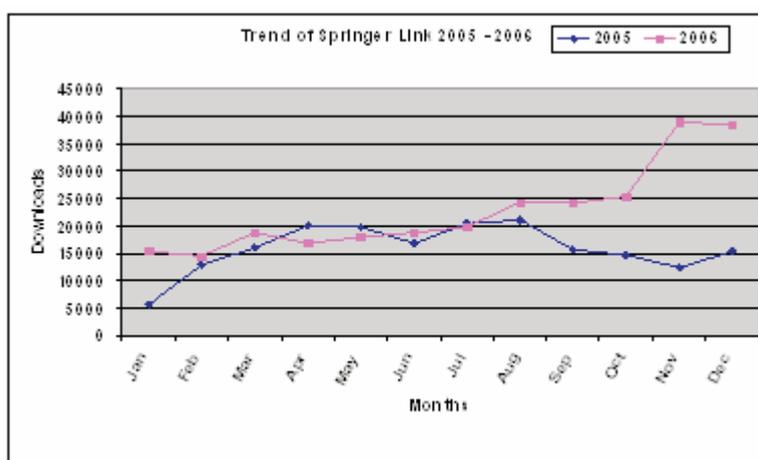
Blackwell publishing is the world's leading society publisher, partnering with 665 academic, medical, and professional societies. It publishes 850 journals and, to date, has over 6,000 books in print. They aim continuously to improve the quality and effectiveness of their products and services. Just as we support the advance of knowledge and learning. The consortium provides the resources to 50 universities in the year 2005 and 60 universities in the year 2006



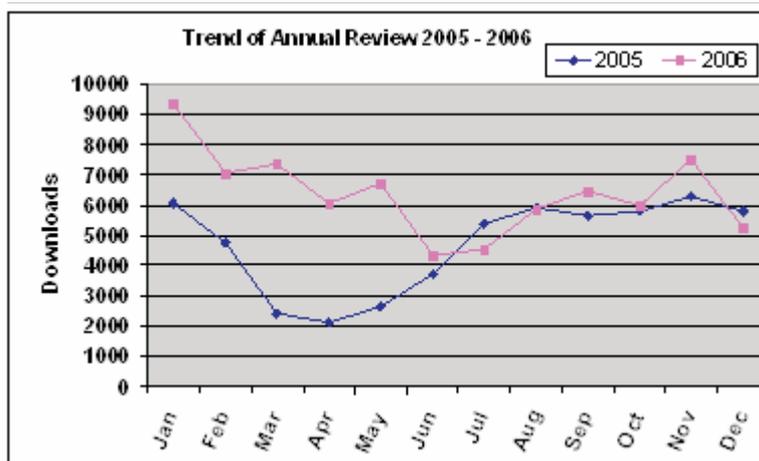
Taylor & Francis becomes a leading international academic publisher. They publish more than 1000 journals and around 1,800 new books each year, with a books backlist in excess of 20,000 specialist titles. Informing Academics from Past to Present. The consortium has been providing Taylor & Francis resources to 50 universities in the year 2005 and from 2006 50 more universities are e-given complimentary access.



Springer link: In the Science / Technology / Medicine (STM) sector, they are the world's second-largest specialist publisher. The main publishing fields are science, medicine, engineering, economics, architecture, construction and transport. The centre has been subscribing to these journals from 2004 onwards under the consortium for 50 universities but now the members increased to 100 in 2006 (50+30+20). Apart from the 100 universities they are giving complimentary access to 16 more universities in 2006.

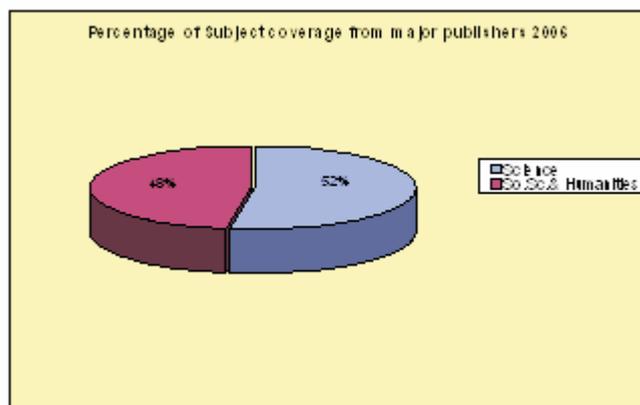


Annual Review publishes authoritative, analytic reviews in 32 focused disciplines within the Biomedical, Physical, and Social Sciences. Annual Reviews publications are among the most highly cited in scientific literature. Annual Reviews offers publications in print and online to individuals, institutions, and consortia throughout the world. Access has been provided to 100 universities under the consortium.



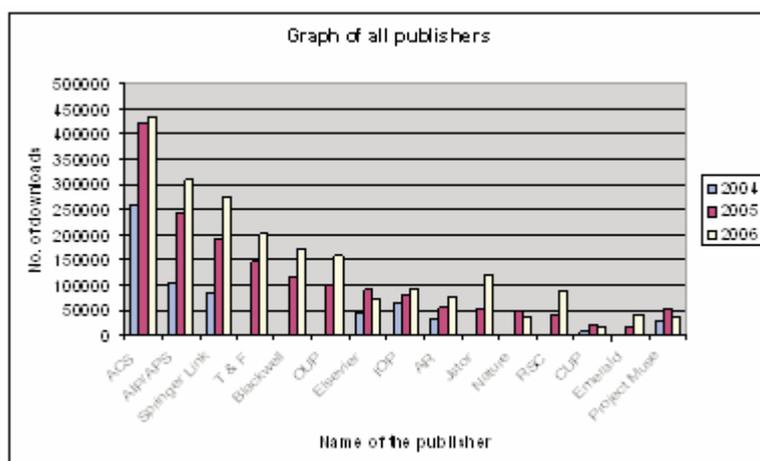
7.2 Subject based usage:

The journals and databases subscribed under UGC-Infonet have 50% collection in Science and Technology, 27% collection in Social Science and 23% in humanities. The subject-wise broader division of whole usage, for the year 2006, has analyzed and it was found that 52% usage in Science subjects from the society publishers like IOP, RSC, ACS, AIP/APS, AR, Elsevier and Nature etc. Usage of science titles published from SpringerLink, Blackwell, T&F, OUP and Project Muse are not included. The following figure also shows that 48% of the total usage is from Social Science and Humanities subject areas. Therefore, we can observe that there is almost a similar usage (on average basis) with reference to broader subjects.



8. Increase in total download (2006)

In the year 2006 there is tremendous growth in over all usage of E-resources. The study of ten major publishers usage reveals that there is an increase of 32 % as compare to the total downloads in the year 2005. In 2007, under UGC INFONET programme, bandwidth for various universities will be upgraded to 2 mbps which will further increase in usage .



9. Future programme

INFLIBNET aims to extend this facility to remaining universities and colleges during eleventh five year plan. The present subscription base will be further strengthened by incorporating more e-resources in 2007. Consortium will be opened for other institutions who wants to join and became members under associate membership.

10. Conclusion

Electronic journals represent a significant and growing part of the academic library's offerings. To make the best use of the resources of the consortium it is necessary to upgrade the bandwidth of the universities. Librarians should take initiatives to make aware of the resources available to their users by conducting awareness programmes and open the library for long hours. In XI plan , INFLIBNET has made ambitious proposal to UGC to extend this service entire academic community including colleges.

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BIOGRAPHY OF AUTHORS

Shri Prem Chand is working as Scientist-C at INFLIBNET Centre since December 1996. He has over 16 years of experience in Library profession and published 26 papers in various professional journals, conferences proceedings and book chapters. He has organized many international and national conferences and delivered lectures during various training programmes. During his service at INFLIBNET, he has contributed immensely in the area of online union catalogue of academic libraries in India. He has completed two major funded projects of DST and WHO. Currently, he is coordinating UGC-INFONET Digital Library Consortium of University Grants Commission (UGC).

Email : premchand@inflibnet.ac.in or prem65-chand@yahoo.co.in



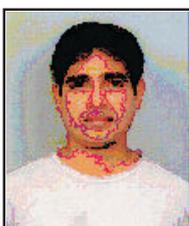
Shri K Prakash is working as Scientific/Technical Officer-I with INFLIBNET Centre since 1995. He holds B.Sc.; MLIS from Karnatak University, Dharwad. He has submitted his PhD thesis in Library Automation. Presently he is working in Serials & Theses Union Database Development & Managing, and in addition to this responsibility he is involved in Training and other Activities of the centre. He has contributed more than 24 papers in seminars, conferences & journals. He is a life member of professional bodies like ILA, IASLIC, KLA, SIS etc. and he is managing Digilib_India discussion forum also.

Email : prakash@inflibnet.ac.in



Dr. (Mrs.) Thiyam Satyabati Devi is currently working as a Project Scientist (LS) in the Informatics Division of INFLIBNET Centre, Ahmedabad. She holds B.Sc. Biochemistry, M.Lib.Sc. DCA and Ph. D in Library and Information Science. She had published around 25 papers in Regional, National and as well as in International level. She attended a number of seminars and conferences. She has worked on a project on Bibliography Compilation of Manipuri Literature under Sahitya Akademi, New Delhi.

Email : satyabati@inflibnet.ac.in



Shri Suresh K. Chauhan, is currently working with INFLIBNET Centre as a Project Scientist. He did his MA (English) and M L I S from Panjab University Chandigarh. Actively involved and assisting in UGC-Infonet E-Journals Consortium initiative of the Centre. Delivered lectures, presentations in the national seminars and workshops conducted by the Centre time to time. As a faculty visited universities for user awareness and training programmes.

Email : chauhan@inflibnet.ac.in
