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INDIAN JOURNAL OF LIBRARY AND INFORMATION SCIENCE

Contents

Digital Library: Boon for Modern Libraries

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Introduction

As the name indicates, a digital library is one where all the reading library are in the digital format. The basic concept behind a digital library is to exploit the facilities of information technology with a mission of sharing resources available globally for providing right and nascent information to the user community at right time. Computer and Telecommunication technologies along with tools and techniques used for digitalization are essential for the digital library. Digital technologies and their applications have also come into every part of our life.

Digital Library

According to Arms 'A digital library is a managed collection of information with associated services by which the information is stored in digital formats and accessible over a network'. The digital content may be stored locally or accessed remotely via computer network. The Digital Library is a new form of managing the knowledge record and culture heritage. Thousand of digital collections have been and will continue, created around the world.

Objectives of Digital Library

The main objectives of the digital library are"

* To capture, store, manipulate and distribute information.

* To introduce and produce new services.

* To have large number of databases to CDs.

* To avoid routine and redundant activities.

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* To provide facility for networking and resource sharing.

* To access national and international journals which are being published only in in machine-readable form.

* To improve the cost effectiveness of library operations.

* To support library functions such as circulations, Serial control, acquisition control, stock maintenance and other routine office works and developing in house databases.

Characteristics of Digital Library

Though digital libraries are still a concept they have certain special characteristics Such as

* Global infrastructure.

* Network accessibility.

* User friendly interface.

* Advanced search and retrieval.

* Supporting multimedia content.

* Accessibility from anywhere, home, school, libraries etc. 24/7 accessibility.

* Greater opportunity for publishing.

* Equal opportunity of access.

* Reduce physical space.

* Break the time, space and language barriers.

* Searching and retrieval facilities.

* Usage of electronic information will steadily increase, and usage of printed.

* Material will decrease.

* Access to the digital library is not bounded in space or time. It can be accessed from anywhere in any time.

* Preservation and conservation.

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Functions of Digital Library

The basic functions of digital libraries are :-

* To capture, store, manipulate information and provide access to a large collection.

* Improve the cost effectiveness of library operations.

* Digitize documents for networking and resource sharing.

* Provide facilities for networking and resource sharing.

* Access national and international journal which are being published only in machine readable form.

* Make information available for longer time.

* Support advanced search and retrieved to enable greater access for information.

* Maintain other routine office works and developing in house database.

* Support all sorts of Library operations or functions.

* Digitize documents for preservation and for space saving.

Pondicherry University Library

The University Library is the heart of any University. The Pondicherry University was established on 11th September 1986. The entire Library House-keeping system including the Journal Subscriptions work of the Library has been computerized. Viz The Bibliographic details of Journals approved/ordered/invoiced/issues received from the Publishers and Suppliers are entered in the computer and are available for Online Access and hence, the students, Research Scholars and Faculty can know the availability of and the gaps in supply of any of the journals at any time. Similarly, 8220 Back Volume of Journals, 3550 thesis and 1450 U.N. Documents have been computerized with proper classified and catalogued respectively.

CD- Rom Data Bases

On the modernization of the University Library, UGC has sanctioned one crore of rupees. under UGC Library Special Grant out of which an expenditure of Rs.31,33,759/- incurred towards the purchase of the Back volume of Journals We have purchased Eight CD-Rom Databases and two Current Contents Diskette Medium Data bases at the total cost of Rs 41,0000/-during the period of 1994-95and 1997. .In addition to this, For Modernizing and Automating Library operations and services 2 CD-ROM Network server with 7 CD-ROM drives which is used for browsing the abstracts and bibliographical information about the articles. To view the full text, 4 Nos of stand-alone PCs with 24 X CD-CD-ROM drives are used. Laser print-out facilities for retrieved full text articles and dot matrix print facility for print out of abstracts from CD-ROM data bases are available for users. All the computer peripherals have been acquired under UGC Library Special Grant.

Binding

Loose Journal issues pertaining to 8220 Nos of(Back) Volumes of Journals subscribed by the University Library during the past years were bound into volumes so far and entered into the computer for quick retrieval purpose for the use of Students, Research Scholars and Faculty.

Online Journals

The Print Medium Journals subscribed by the University Library are found to be inadequate to meet the information needs of the Researchers, Students and Faculty members of the University, Online Journals are subscribed to supplement the print journals to help the academic development of the university to a large extent. We have been subscribing "Science Direct" – database of journals published by ELSEVIER is available online from 2004 onwards Science Direct covers current seven Disciplines namely Biochemistry, Genetics and Molecular Biology (220), Chemistry (85), Computer Science(112), Earth and Planetary Sciences (88), Materials Science(95), Mathematics (75) and Physics and Astronomy (88) at the total cost of Rs.45,39,519/- for the year 2007. Similarly, E Journals 1995-2006 also available for online access. The Eight Subject Back files of Science Direct of Science direct namely Biochemistry, Genetics and Molecular Biology (108), Earth and Planetary Sciences(93), Economics,

Econometrics and Finance(59) Environmental Science(77), Inorganic Chemistry(9),Material Science(101), Organic Chemistry (8) and Physics General (70) subscribed at a one time cost Rs.63,96,140/- from January 2004 to perpetual. Annual Reviews (Electronic Back Volumes) Archives covering a comprehensive collection of Annual Reviews Back Volumes with content spanning from Biomedical Sciences, Physical Sciences and Social Sciences dating back to the very first volume of Annual Reviews in 1932 and upto 2002 on perpetual access subscribed on one time payment Rs.1.61 lakhs.

EBSCO Publishing Ltd., -online publishing company of U.S.A. provides access to the electronic journals databases. Viz. "Business Source Elite" and "Academic Search Elite".

The Academic Search Elite covers 1432 Abstracts and 2,063 Full Text Journals. The Business source Elite covers 687 Abstracts and 1128 Full Text Journals.

UGC Infonet consortiume- Journals

Pondicherry University Library has been provided online access with IP based access you E-Journals subscribed under UGC INFONET PROGRAMME by the INFLIBNET Centre of UGC and covers the total number of Journals 4053.

The Journal Reading Hall, Computer Browsing Area and U.N. Depository in the first floor of the Library Building have been fully Air-conditioned with a stand by Generator facility thanks to the UGC Specific Grant of Rs.50 Lakhs for the purpose. New Furniture, Windows Screen, Potted Plants, Painting for Furniture, Wall, and Flooring respectively in the Library have aesthetically made in the Journal Section.

The UGC 10th plan Library Grant of Rs.176.50 Lakhs for Books and Journals has been fully spent and has been exceeded by 57.64 Lakhs. The excess expenditure has been sanctioned by the Vice-chancellors out of the overall 10th plan Grant.

Library Orientation Training Programmes are being conducted by the University Librarian every year for orienting the newly admitted Students, Research Scholars and newly appointed members of the Faculty of the University to the Resources of Library, methods of searching Information both online and offline different services available in the Library etc.

The Assistant Librarian of the University is giving Orientation training in latest Library Techniques and accessing of Library Resources especially electronic Resources, for the participants of all the UGC-Academic Staff College Orientation Programmes and Refresher Courses e.g. Pondicherry University Library.

In view of the excellent infrastructure facilities and peaceful and congenial atmosphere prevails in the Library. The NAAC Peer Team visited the University in 2006 for reassessment and reaccreditation of the University has appreciated the Library development and performance including Distinguished Visitors.

Conclusion

Library development can be studied in four stages. The ancient and medieval belong to traditional library concepts. The modern libraries belong to traditional libraries in an automated environment. The present libraries are drifting towards a digital environment. Though digital library is on the nascent stage, most of the libraries are trying their level best to convert most of their holdings into digital. The digital libraries help the readers to get the information quickly though the national and international level without delay and with limited cost. Nowadays without digital libraries, traditional libraries cannot satisfy all kinds of reader

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Outreaching of information service by Environmental Information System [ENVIS]: A case study on coastal ecosystems

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Abstract

The Ministry of Environment and Forests, Government of India established 78 Environmental Information System (ENVIS) centres in different nodes such as governmental nodes, Institutional nodes and NGO nodes to provide environmental related information to scientists, policy planners and decision-makers all over India. This article explains the efforts of ENVIS Centres in dissemination of environmental information to various aspects in general and coastal ecosystem in particular based on the user's benefits analysis.

Keywords

Information Dissemination, ENVIS, Coastal Ecosystem, Databases

Introduction

India has a long coastline of 8100 kms with different type of coastal ecosystems along with the east and west coast and has rich flora and fauna. Coastal areas, the place where the waters of the seas meet the land are endowed with a very wide range of coastal ecosystem like mangroves, coral reefs, lagoons, sea grass, salt marsh, estuary etc. (Kathiresan and Bingham, 2001). These ecosystems often referred as the most important and productive ecosystem in the world and support large number of organisms by providing breeding and nursery habitats to them (Kathiresan, 2002; Rajendran and Kathiresan, 1999). Pollution of the coastal waters

can greatly reduce the production of fish, degradation of coastal nursery grounds and other wetland habits. The storm protection afforded by fringing reefs and mangrove forests can be lost if the corals die or the mangrove removed (Ramachandran, 2006).

Information on these ecosystems is lying scattered and not easily available for access. Information technology has made the communication cheaper, quicker and more efficient (Arora and Kaur, 1992). Realizing the importance of the information technology, the Ministry of Environment and Forests has established an Environmental Information System [ENVIS] centre at the Centre of Advanced Study in Marine Biology to collect available information and find out the data gaps and action to fill the gaps and to provide information to user community through online and offline on coastal ecosystem like Estuaries, Mangroves, Coral Reefs and Lagoons. Similar type of centres also established for other aspects such as Faunal Diversity, Floral Diversity, Pollution etc., (MoEF, 2005-2006). This article explains how the information dissemination being carried out by the ENVIS centres on various aspects in general and coastal ecosystem in particularly.

ENVIS Centres in India

The Ministry of Environment and Forests under Government of India initiated the programme of Environmental Information System Centre in December 1982. It is a decentralized system using the distributed network of databases to ensure integration of national efforts in environmental information.

There are 78 ENVIS centres in India under three different Nodes – Government Node (30), Institutional Node (29) and NGO Node (19). The motto of each centre is to collect, collate, retrieve and disseminate the information on their assigned subject areas (MoEF, 2005-2006). The focus of ENVIS Centres since its inception has been providing environmental information to decision makers, policy planners, scientists, engineers, research workers, students, NGOs and people all over the country (Annadurai et al., 1999).

The ENVIS centres are strengthened through various programmes such as Environmental Management Capacity Building [EMCB-ENVIS] and a global project on Sustainable Development Network Programme [SDNP-ENVIS], in collaboration with UNDP, IDRC, Canada and the Ministry of Environment and Forests was initiated in June 1999. The SDNP-India was primarily involved in designing, launching, maintenance and enhancement of its website (www.sdnp.nic.in) with financial support of the World Bank (Jaitley et al., 2004). These centres act as a repository of information for in-house use and also functions as resource centre of external users on appropriate technology and environment management.

Objectives of ENVIS Centers

The long-term and short-term objectives of ENVIS are as follows:

Long-term Objectives:

* To build up repository and dissemination centres in Environmental Sciences.

* To modernize information acquisition, processing, storage, retrieval and dissemination.

* To support and promote Research and Development and innovation in environmental information technology and database creation.

Short-term objectives:

* To provide National Environmental Information relevant to the present needs and capable of meeting future needs.

* To build storage, retrieval and dissemination capabilities with the ultimate objective of disseminating information speedily including websites.

* To promote national and international co-operation for exchange of environment related information.

* To promote, support and assist education and training programs designed to enhance environmental information processing and utilizing capabilities.

Major Services of ENVIS

With a view to cater to policy makers, academicians, researchers and the general public throughout the country, the following services have been provided by the ENVIS centres.

* Abstracting services

* Query Response service.

* Information on different subject areas of Environment for researchers, policy makers, academia etc.

* Identifies data gaps and knowledge gaps in specified subject area and action to fill these gaps.

* Liaise with relevant International Information System and other national information system.

* Databases on different subject areas of environment.

* Web-based networking support.

Monitoring & Evaluation

Technical Committees, comprising of experts from different subject areas were constituted by the Ministry on the recommendations of the ENVIS Advisory Committee to help establish the content of the ENVIS-website and bench mark the databases. Committee members were also to look into the modalities, monitoring and evaluation system and performance of the ENVIS (Jaitly et al., 2004).

ENVIS Centre on Coastal Ecosystem

Storage of Information

Information is a key to the growth of knowledge and dissemination of information is crucial for scientific enterprise. It is imperative for scientists to keep abreast of what is

happening around the world as well as keep others informed of what they are doing.

Advances in marine science and technology depend on the effective flow of information and data from the collectors to various types of users. The available data on marine life are lying scattered. Access to desired information is also difficult at times. The sustainable exploitation of coastal and marine living resources needs proper, adequate, up-to-date and constant flow of information. In order to satisfy information needs of researchers,planners, environmentalists and common people, efficient online and offline ways of retrieval and dissemination of data with the aid of computer technology become imperative. Collation of such data in speedy retrieval becomes necessary so as to avoid existing information vacuum (Kannan and Kannan, 1999).

In this regard, the information base in the centre is being continuously strengthened through regular collections, collation and storage of scientific and technical information on coastal environment and related areas by visiting various institutions in India and cataloguing the information according to subjects and get available in both online and offline.

Data collection for the present work

The data collection has been made year wise in relation to type of services such as query response, reprint supply, publications and news paper clippings from the annual report and publications of the ENVIS centre at Centre of Advanced Study in Marine Biology, Annamalai University.

Results and Discussion

The Centre has engaged information services such as news clippings, publication of annual report, state-of-the-art reports, special publications, development of data bases on the assigned subjects and liaison with other information centres since its inception from 1992. Further, the Centre has responded to various requests for information on diverse areas related to coastal wetlands from different user groups. The centre is receiving queries from various user communities such as research institutes, universities, colleges, governmental and non-governmental organizations and managers of coastal wetland ecosystems (Fig.1).

Fig. 1 Number of queries responded to National and International users
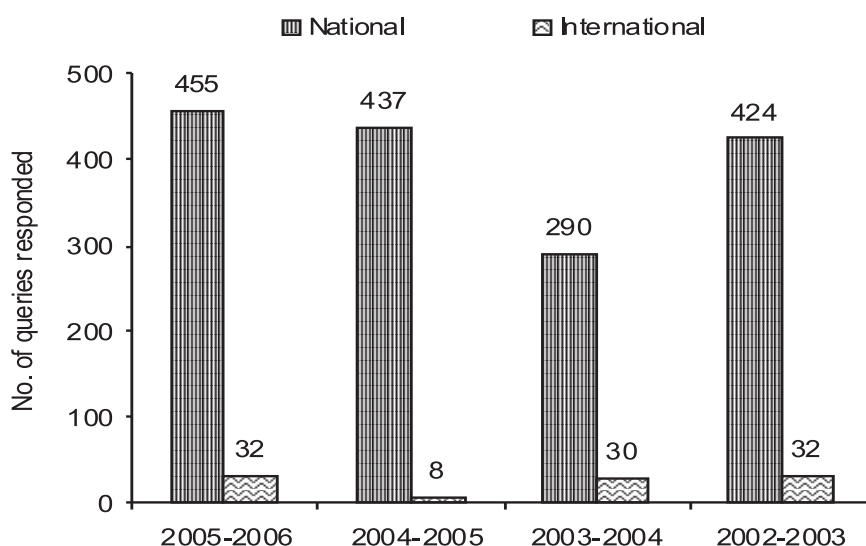
In general, number of queries responded is consistent around 450 per year, 38 per month and one in a day. If the requested query is not relevant to subject of the centre, the same has been forwarded to concerned ENVIS centre to provide requested information. The user community can get all types of information pertaining to coastal and aquatic ecosystem through e-mail without visiting the centre.

In order to fulfill the user's requirement, the centre has also subscribing a CD- ROM based ASFA [Aquatic Science and Fisheries Abstract] and ABAFR [Aquatic Biology, Aquaculture and Fisheries Research] databases regularly. These databases are the best suited for aquatic living resources with an international coverage for effective dissemination of scientific information and up-dated developments in the coastal ecosystem such as Estuaries, Mangroves, Coral Reefs and Lagoons. This facility is available only few institutes in India. Through these databases, users can access the abstracts of scientific information related to any aquatic ecosystem through keyword search. The Centre has also providing information through other databases such as Reef base, Fish base, GLOMIS (a global data bases on the resources of coral reefs, Fishes and Mangroves respectively). The information provided with both hard and soft copy for the past four years are given in Table-1.

Table 1: Information provided through Hard & Soft copies

Year	No. of Abstract supplied to users	
	Hard copy	Soft copy
2005-2006	4057	75937
2004-2005	4027	122781
2003-2004	2883	93242
2002-2003	4723	90331

A bi-annual newsletter "Seshaiyana", brought out by the Centre, carries interesting articles about marine ecosystems, recent scientific news and forthcoming meetings and conferences. So far, this centre has brought out 14 volumes and 28 issues of newsletter and 4 volumes of special newsletters. The centre has also produced 12 volumes of news clippings on coastal ecosystems which appeared in various dailies/magazines etc. for online and offline access. These information are helpful to the young researchers those who are working in the coastal ecosystem.

The publications of the ENVIS Centre are available in the website (http://aucasmbenvis.nic.in) for free online access. Number of users visited the website is given in Table 2.

Table 2: Number of web browsers for the past four years

Year	Website Browsers	Fold of increase
2005-2006	7344	3.4
2004-2005	5205	2.3
2003-2004	3112	1.4
2002-2003	2190	---

It is interesting to note that the users increased by 1.4, 2.3 and 3.4 times every year in 2003-2004, 2004-2005 and 2005-2006 as compared to 2002-2003. This response indicates the quality of service being rendered by the centre. The feedback received from the users also proved the importance of the ENVIS centres for easy access of information.

Conclusion

Most of the developing countries do not have infrastructure for effective communication and technology to provide knowledge sharing and dissemination throughout the world. In India, many universities and colleges do not have such infrastructure facilities even today and most scientists, scholars and student communities have no access to the latest scientific information. As a result, the performance of scientific community can be affected (www.smallbusinessbible.org).

Due to the higher subscription prices for national and international journals the libraries in India have been forced to reduce the number of journals and secondary sources of service have gone to electronic form. Many of the information available online are not accessed by all the scientific community. It is allowed only for the subscribed people by using username and password. The marine related centres in India are also reduced the number of journals subscribed every year due to the increasing rates of subscription and because of that they are looking for CD-ROM based searchable databases for the effective dissemination of information by using the latest technology. It is also not possible to purchase the databases for it own due to heavy charges. Hence, the Ministry of Environment and Forests supports financially to purchase CD-ROM based databases to each centres for effective information dissemination in the relevant fields assigned to them. This type of information service is essential as for as India concern and it has been strengthened regularly with more information as provided by Environmental Protection Agency (EPA) and European Environmental Agency (EEA).

From the study, the ENVIS centre at Centre of Advanced Study in Marine Biology has a great potential of supply much more information to cater the growing needs of those who are involved in aquatic and coastal ecosystem research in the world.

Acknowledgement

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The Sources of Information by the Authors of the JMAU

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Abstract

The core list of journals used by the users of all the four agricultural university libraries in Maharashtra was extracted by citations analysis of JMAU for the period 1996-2001. Rank list of journals with frequency of citations was given. The top six journals from rank list were recommended to subscribe in all the libraries under study.

Key words

Citation analysis, sources used for JMAU, authors attitude for sources

Citation analysis of Journal of Maharashtra Agricultural Universities (JMAU) has been carried out to determine the core list of Journals used by the users of these libraries. For finding out the core list of journals used by the users in the libraries of four Agricultural universities in Maharashtra namely, Dr.Punjabrao Deshmukh Krishi Vidypeeth, Akola Mahatma Phule Krishi Vidypeeth Rahuri, Marathwada Krishi Vidypeeth Parbhani and Dr. Balasaheb Sawant Konkan Krishi Vidypeeth Dapoli. The citations from journal of Maharashtra Agricultural Universities of the years 1996 to 2001 were analysed. The study was limited to journal sources only.

Materials and methods

The citations were collected from the journal of Maharashtra Agricultural Universities. The period of study was from the year 1996 to 2001. The authors of the articles are the users of university library of four agricultural universities in Maharashtra. The trend of using sources of information was studied through the of sourceswise citation analysis table and pie-chart. The frequency of citations used was shown through the rank list of journal cited in journal of Maharashtra Agricultural Universities. The citations were collected on paper strips for analysis and analised sourcewise and journal wise.

Result and disccusion :

Table 1 : Sources wise citation analysis

Sr.No.	Source	Number of references cited
1.	Core journals citations	1184
2.	Citations from other sources	1129
3.	Total citations	3733
4.	Total journal citation	2604

It was observed from table No.1 that total citations were 3733. Out of them, journals citations were 2604, citations for other sources were 1129 and core journals citations were 1184.

The source-wise percentage of citations was shown in pie chart of citation analysis of JMAU. Journal citations were 61.9 per cent and other sources citations were 38 per cent.

■ Core journals citations

■ Journal citations other core journals

□ Citations from other sources
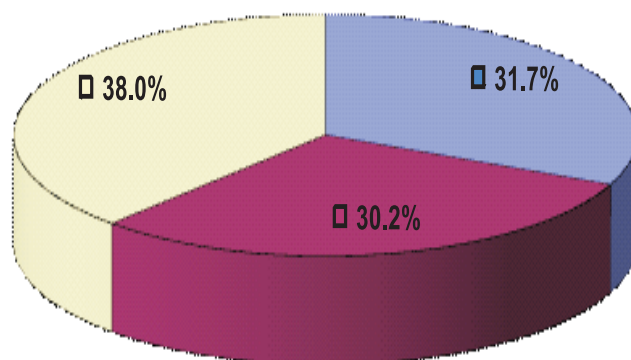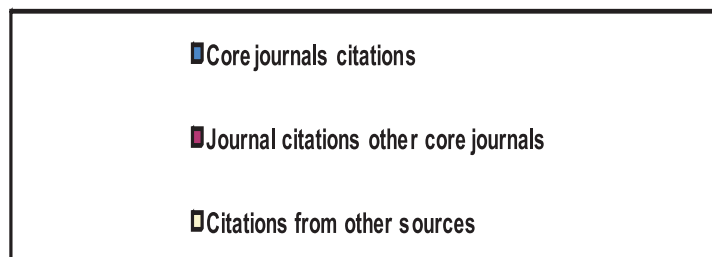
Fig 1. Pie chart showing citation analysis of journal of Maharashtra Agricultural Univesities

The citations were arranged journal-wise and ranked list of journals was prepared in descending order.

The list of core journals thus obtained is shown in Table1. The journals having more than 10 citations were included in the core list.

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Table 2: **Rank list of journal of Maharashtra Agricultural Universities showing the frequency of citations**

Sr.No.	Name of The Journals	Citations
1	Journal of Maharashtra Agricultural Universities	194
2	Indian Journal of Agronomy	167
3	Indian Journal of Agricultural Sciences	114
4	Indian Journal of Genetics	82
5	Journal of Indian Society of Soil Sciences	67
6	Agronomy Journal	61
7	Madras Agricultural Journal	52
8	Crop Science	40
9	Indian Journal of Horticulture	28
10	ICAR Publications	28
11	Plant Soil	27
12	Current Science	23
13	Indian Farming	23
14	Indian Journal of Entomology	23
15	Indian Phytopath	22
16	Indian Journal of Agricultural Research	20
17	Journal of Oilseeds Research	20
18	Journal of Economic Entomology	18
19	South Indian Horticulture	18
20	Pesticides	17
21	Indian Veterinary Journal	16
22	Punjab Horticulture	15
23	Crop Improvement	14
24	Indian Journal of Pulses Research	14
25	Analytical Chemistry	13
26	Sorghum Newsletter	13
27	Indian Journal of Mycological Plant Pathology	12
28	Andhra Agriculture Journal	11
29	IARI Publication	10
30	ICRISAT Publication	10

It can be observed from Table 2 that more citations were cited from the first six journals only. Those 6 journals were journal of Maharashtra Agricultural Universities, Indian journal of Agronomy, Indian journal of Agricultural Science, Indian journal of Genetics, Journal of Indian Society of Soil Science and Agronomy journal. Maximum references were cited from the journal of Maharashtra Agricultural Universities and those were 194. All the top six journals were Indian journals. The journals included in the core list are essential for the users in all libraries under study and hence can be subscribed all the libraries under study.

Presently, library users are asking for electronic journals and its access for information collection. Natarajan (2001) said about users attitude towards electronic journals that the pedagogical issues raised by E- journals cannot be ignored because number of journals in this format are increasing rapidly and student expectations regarding their usefulness are ever higher. The advantages of convenient, 24-hour-a-day access, full text searching facility, interdisciplinary connections, and the most current research articles offered electronically will only become more apparent in the future.

Conclusions

It was concluded that the users of four agricultural universities are using maximum Indian Journals. The top six journals and other journals covered in the core list should be subscribed in four agricultural universities libraries in Maharashtra. Other than Indian journals users should be provided E-journals and access to information sources available on internet and different databases.

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Application of Radio Frequency Identification (RFID) in Engineering College Library: An Experience.

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Introduction

Various systems have been used such as Bar-Coding, Electro-magnetic strips, Radio Frequency Identification (RFID) with the intention of improving the quality of service to the users. RFID has many applications in libraries that can be highly beneficial, particularly for circulation staff. Since RFID tags can be read through an item, there is no need to open a book cover or CD/DVD case to scan an item. This would help alleviate injuries such as repetitive strain injury that can occur over many years. Since RFID tags can also be read while an item is moving, using RFID readers to check-in returned items while on a conveyor belt reduces staff time. Furthermore, inventories of materials could be done on the shelf within seconds. RFID helps a librarian in providing the users with optimum utilization of available resources.

Concept of RFID

Radio Frequency Identification Technology was primarily used to identify the aircraft during the Second World War, to distinguish friendly aircraft from enemies' aircrafts. Large powered RFID tags or transponders were placed on the aircrafts for correct identification of radar signals. This was the first usage of RFID and since then the sameis used in present day aviation traffic control. The development of microchip and later on the technological advances have led to the design and use of passive RFID tags. Today, the RFID technology is used as an integral part of business systems by many business houses, including Libraries and Information Systems.

RFID is a data collection technology that uses electronic tags for storing data. The tag, also known as an "electronic label," "transponder" or "code plate," is made up of an RFID chip attached to an antenna, transmitting in the kilohertz, megahertz and gigahertz ranges. Tags may be battery-powered or derive their power from the Radio Frequency waves coming from the reader.[1]

Radio Frequency Identification tag(s) uses wireless technology to transmit product serial numbers from tags to a scanner, without human intervention. It is regarded as a likely successor to barcode inventory tracking systems.[2]

Components of RFID

A comprehensive RFID system has the following components:

* RFID Tag.
* RFID Reader & Antenna.
* Server on which the software that interfaces with the integrated library software is loaded.
* Electronic Security Gate.

RFID Tag

Normally three different kinds of RFID tags are used based on the requirement of the application. The details are follows:

* Passive tag   - Operates from reader.
* Active tag   - Integrating a battery.
* Semi-passive tag - No battery required.

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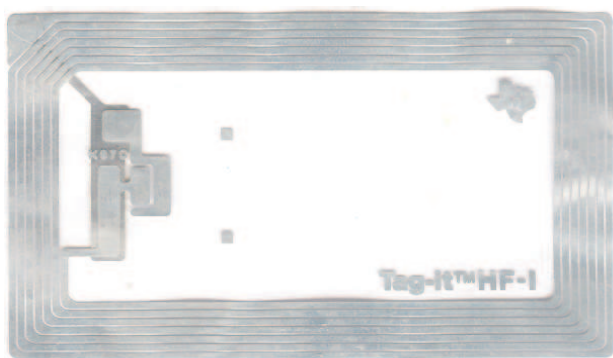E-mail: vinumoorthy@yahoo.com

Figure 1: RFID Tag

Figure 2: Electronic Security Gate

RFID Reader and Antenna

RFID reader can be fixed or handheld and is usually connected to computer. The RFID reader handles the communication between the information system and the RFID tag. RFID antenna connects to the RFID reader, can be of varying size and structure, depending on the communication distance required for a given system's performance. The antenna activates the RFID tag and transfers data by emitting wireless pulses.

Server

The server is the heart of the comprehensive RFID system. It is the communication gateway among the various components. It receives the information from one or more of the readers and exchanges information with the circulation database. The server typically includes a transaction database so that reports can be produced.

Electronic Security Gates

EAS is an anti-theft system used by the libraries. Pre RFID systems utilized metallic security strips that needed to be desensitized a separate action during a normal checkout in order for patrons to exit the library without setting off an alarm. The security feature is incorporated by RFID technology in the tag itself and is much more conveniently activated or deactivated during the check in or check out operation, security gates, which play a crucial role in preventing loss of library property, typically set an alarm when an unauthorized or improper checkout item is detected.

Areas of Application of RFID

RFID has been successfully applied in the following areas:

* Issuing of Passports: RFID tags are being used in passport issued by many countries. The first RFID passports were issued by Malaysia in 1998.

* RFID tags are used for publ ic transport systems for transport payment.

* It is used by farmers for product tracking : Candian Cattle Indentification Agency, using RFID tags to identify their cattles.

* Microwave RFID tags are used in long range access control for vehicle : since the 1990s RFID tags have been used in car keys. Without the correct RFID, the car will not start.

* Implantable RFID tags or transponders can be used for animal identification. The transponders are more well-known as passive RFID technology on microchip implant (animal).

* RFID is used in inventory systems: An advanced automatic identification technology such as the Auto-ID system based on the Radio Frequency Identification (RFID) technology has two values for inventory systems. First, the visibility provided by this technology allows an accurate knowledge on the inventory level by eliminating the discrepancy between inventory record and physical inventory.

* Human implants: some of the western countries are using RFID tag for identifying their personnel.

* Libraries: In the recent years a sizeable number of libraries are introducing this technology.

Need for RFID Technology in Libraries

The rising cost of books and other print materials, the restriction on library budgets and the heterogeneous user community are posing problems to the library management. RFID technology helps the library management to overcome these problems and offer more secure and foolproof library services to their users. Some of the factors that necessitate the use of the RFID in libraries are:

* To increase collection accuracy with accurate reshelving of material, thus avoiding the problems of wrong shelving.

* To decrease document injuries caused at the time of charging and discharging.

* To provide great help and accuracy in library books stock taking

* Provide more value added future service with same number of staff

* Increase the overall proficiency in the library.

* Facilitates the readers to take and make use of the personal books into the library along with the library books, which is not possible at present; and

* To minimize losses of library materials.

Literature Review on Application of RFID in Libraries

Butters (2007)[3] described the perceived threats of radio frequency identification (RFID) systems in libraries, in order to probe their technical feasibility. A study that measures performance of RFID library system at a university library by examining factors, namely tag placement, reader orientation sensitivity, read rate, reading distance, and metal and electromagnetic interference were reported by Golding and Tennant (2007)[4]. Rodriguez-Silva (2007)[5] examined the quantitative assessment of the benefits of RFID technology for libraries in the European countries. Sujatha (2007)[6] outlined the brief introduction to RFID, its components, need, usage, advantages and disadvantages and also highlighted the experience on account of the implement of RFID

technology in Dr. B.R. Ambedkar Open University Library. The feasibility study regarding the structure and application of the RFID system, an evaluation and a model for implementing RFID solutions in libraries was provided by Yu (2007)[7]. The application of RFID Technology for Libraries with its advantages and disadvantages and draft related expenditure of RFID application in libraries was stated by Boss (2006)[8]. Jay Singh and Navjit Brar and Fong (2006)[9] highlighted the state of RFID applications in libraries and explained the basic requirements and components needed to implement the RFID technology in the libraries. An actual implementation of RFID tagging system in one local University library in Malaysia was examined by Selamat and Majlis (2006)[10]. It focuses on three main challenges during the implementation which relates to system integration, parallel operation with existing system and procedure changes. The implementation of RFID technology in a library faced many challenges, as experienced by Shahid (2005)[11] and he explained the use of RFID technology in libraries and how the technology is used in circulation, tracking, inventorying, and security of library materials.

Value/Utility of RFID in Libraries

RFID can provide economic and cost effective solutions to many key issues faced by the librarians today.

* Stock verification: RFID assists in checking very quickly, whether the books are located in their proper shelf space or not in the library. It saves a lot of time and human effort.

* Locating a specific resource: Using the scanner / reader in conjunction with the library information system, a specific volume can be immediately located. It would identify if the book was on loan. If the volume is within the library, it would identify its correct location.

* Check-in and Check-out: with the use of the RFID System, a user can check-out and check-in of library resources without the help of library personnel.

* Self Return of Books: The RFID system enables self return of books by the users.

This saves time, is convenient and allows crucial manpower to be available for other duties.

* Security: The RFID monitors provide security to the resources of a library. Smart electronic gates would alert the library staff if a patron, intentionally or by mistake, was about to remove a volume from the library without a proper check out. Even the volume being removed would be identified. Earlier systems like bar codes and electro magnetic systems can be duplicated at low cost and enable some unscrupulous users to devastate the resources of a library.

* Library Membership Cards: The RFID cards can eliminate the necessity of elaborate library membership cards and the record keeping involved with it. Smart cards similar to Bank Credit Cards and ATM cards can be used with swap machines. However, these cards used in the context of libraries would store several bytes of relevant data.

* DATA Analysis: With the RFID system in place, a librarian can at any point of time draw data analysis from the library information system. It would help in analyzing the borrowing patterns of individual users as well as that of the entire lot. Patterns related to the movement of specific documents can also be derived. These would help in making important decisions such as purchase decisions, budgetary decisions and inter-library loans etc, which are very important in the management of a library.

Velammal Educational Trust, Chennai: An Overview.

Velammal Educational Trust is a registered non-minority service organization established in the year 1986 to inculcate among the youth a sense of discipline which is important to mould them into useful and capable citizens. The watch words of the Trust are Dedication, Determination and Distinction. The Trust which proved its mettle in school administration entered in the field of Technical Education in 1995 by starting two institutions, namely, Velammal Engineering College and Velammal College of Management and Computer Studies. The Trust is currently managing with eleven educational institutions including schools, engineering colleges, arts and science colleges.

Velammal Engineering College, Chennai

Velammal Engineering College was established in the year 1995. It is one among the few engineering colleges located very near to Chennai city. College is approved by All India Council for Technical Education (A.I.C.T.E) and is affiliated to Anna University and also this institution was ISO certified and Accredited by National Board of Accreditation (NBA). It offers various under graduate, post graduate and research level courses.

A separate library building named after Dr. S.R. Ranganathan, the father of Library Science, in an area of 25,500 square feet under the estimated cost of Rs. 5 crores with modern facilities like centralized air-condition, digital library unit with rich collection of subject CD's, modern reading room with well furnished furniture, digital photo copying unit, internet browsing unit, video conference room, conference hall, discussion rooms to create R&D skills, audio and video section.

The central library serves more than 3600 students, teachers, non teaching staff and research scholars. At present, the library has 53,000 books and non book materials, 273 periodicals both national and international and subscribing more than 500 e-journals and 3500 CD collection, video conferencing facility and separate section for digital library.

All the library in-house transactions are computerized and it is connected to intranet. Barcode technology has been used since the year 2000. The library also provides internet browsing facility and it has more than 800 students' project reports and previous question papers are in e-form. The library has offers the following services to it members:

* Lending services.

* Online Public Access Cataloguing Service (OPAC).

* On line database services.

* Internet browsing.

* Photocopying services.

* Conducting book exhibition.
* Electronic document delivery service.
* Conducting technical film shows.
* Arranging of inter library loan.
* Book bank scheme for SC/ST students.
* General book bank scheme for economically weaker students.

The library is run by qualified, well experienced and user friendly library staff (One Librarian, three Asst. Librarians, 7 Library Asst. and 2 administrative staff).

Users' Feed Back on RFID Application

A survey was conducted among the engineering students of various branches at undergraduate and post graduate level and need for RFID technology.

faculty members of the college to study their satisfaction level about the library resources, services and introduction of new technology like RFID etc, in the library. A structured questionnaire has been designed and circulated to the students and faculty members, The questionnaire consists of the following questions related to satisfaction level of institution's library resources like collection of books, journals/ periodicals, CD ROM, internet facility, e-journals access provision, video conferencing etc. and library services like loan of books, journals/ periodicals, CD ROM, reference services, inter-library loan, reprography, internet service, e-journals and online database services and also users' satisfaction level of computers and software availability and the

Table 1

S. No	Description	Questionnaire distributed	Questionnaire received	Percentage
1	Students -UG	250	237	39.5
2	Students PG	250	224	37.3
3	Faculty	100	81	13.5
	Total	600	542	90.3

Distribution of Questionnaire and Responses Received

It is seen from the Table 1 that the response rate is 90.3%. A majority (237) of the respondents (39.5%) belong to under graduate students and 224 respondents belong to post graduate students and remaining are faculty members (13.5%).

Table 2

S. No	Sex	No.of Respondents	Percentage
1.	Male	329	60.7
2.	Female	213	39.3
	Total	**542**	**100**

Classification of Respondents by Sex

The data in the Table 2 presents the gender of the respondents. It is found that a majority (60.7%) of the respondents belongs to male community and 213 (39.3%) respondents belong to female community.

Table 3
Classification of Respondents – Department Wise

S. No	Name of the Department	No.of Respondents	Percentage
1.	Electronics & Communication Engineering	85	15.7
2.	Information Technology	82	15.1
3.	Mechanical Engineering	87	16.1
4.	Electrical & Electronics Engineering	89	16.4
5.	Computer Science and Engineering	86	15.9
6	Civil Engineering	55	10.1
7	Business Administration	58	10.7
	Total	542	100

It is seen from the Table 3 that the response are classified the department wise, the percentage of the responses more or less equal from 15.1% to 16.4% Except department of Business Administration(10..5%) and Civil Engineering (10.1%).

Table 4
Users' Satisfaction on the Institution's Library Sources

From Table 4, the satisfaction level of the users in the institution's library sources can be

S. No.	Sources	Satisfied	Not Satisfied	RANK
1	Books	428 (78.9)	114 (21.1)	1
2	Journals/ periodicals	401 (73.9)	141 (26.1)	2
4	Project reports	348 (64.2)	194 (35.8)	6
5	CD ROM collections	367 (67.7)	175 (32.3)	4
6	Internet facility	382 (70.5)	160 (29.5)	3
7	e-journals access provision	351 (64.8)	191 (35.2)	5
8	Video Conferencing (AnnaEduSat)	332 (61.3)	210 (38.7)	7

(Figures in brackets indicate the percentage)

understood. Books, Journals/ Periodicals and Internet facility are ranked first, second and third respectively, CD ROM products and e- journal access are ranked subsequently.

Table 5

Users' Satisfaction on the Institution's Library Services

S.No.	Description	Satisfied	Not Satisfied	RANK
1	Loan of books	491 (90.6)	51 (9.4)	1
2	Journals/ periodicals circulations	472 (87.1)	70 (12.9)	2
3	CD ROM loan & print outs	431 (79.5)	111 (20.5)	4
4	Reference service	458 (84.5)	84 (15.5)	3
5	Reservation service	376 (69.4)	166 (30.6)	7
6	Inter library loan	294 (54.2)	248 (45.8)	9
7	Reprography service	361 (66.6)	181 (33.4)	8
8	Internet service	422 (77.9)	120 (22.1)	5
9	e-journals and online database services	415 (76.6)	127 (23.4)	6

Velammal Engineering College library provides a number of services to the user communities, as listed in the table. Based on the users' opinion (Table 5), it is observed that traditional services are ranked first, loan of books, journals/periodicals circulation and reference service are ranked second and third respectively. The modern services such as "CD ROM loan and print outs", "Internet service" and "e-journals and online database services" are ranked as fourth, fifth and sixth respectively.

Table 6

Users' Satisfaction Level on Computers and Software Availability

S. No.	Description	Satisfied	Not Satisfied	Rank
1	Adequacy of computer	381 (70.3)	161 (29.7)	2
2	Configuration of computers	359 (66.2)	183 (33.8)	3
3	Queries search/OPAC	473 (87.3)	69 (12.7)	1
4	LAN	312 (57.6)	230 (42.4)	4
5	Adequacy of bandwidth	289 (53.3)	253 (46.7)	5

It is evident from Table 6 that 87.3 % of the users are satisfied with their library "Queries search/OPAC" and 70.3 % of the respondents showed their satisfaction with their library having adequate number of computer and 66.2% of the users are satisfied with their institutional library having high configuration computers.

Table 7

A Need for RFID Applications

S.No.	Description	Yes	No	RANK
1	Are you satisfied with existing barcode technology applications in your library?	468 (86.3)	74 (13.7)	1
2	Are you facing difficulties in locating of books in the book shelves?	341 (62.9)	201 (37.1)	5
3	Are you finding any problems at the time of borrow/return of books (wait for long time to return and issue)?	379 (69.9)	163 (30.1)	3
4	Do you want to use your own books inside of the library?	409 (75.5)	133 (24.5)	2
5	Are you feeling very inconvenient during the stock verification (normally no transaction at the time of stock taking)?	296 (54.6)	246 (45.4)	7
6	Are you aware of RFID Technology?	372 (68.6)	170 (31.4)	4
7	Is RFID technology needed for your library management?	331 (61.2)	211 (38.8)	6

It is evident from the Table 7 that 86.3 % of the users are satisfied with existing barcode technology /applications in their library. Even though 69.9% of the respondents are facing problems at the time of borrow/return of books. 62.9 % of the users are facing difficulties in locating of books in the book shelves and above 61.2% of the respondents mentioned RFID technology is needed for their library management. Based on the opinion of the users, it is clearly indicated that the implementation of RFID technology is unavoidable in Velammal Engineering College library in order to avoid the problems in future.

Implementation of RFID Technology in Velammal Engineering College: An Experience.

Present Status of RFID in Velammal Engineering College.

To implement the RFID technology in our college on the phased manner, we have divided into three areas; first is issuing of RFID card to the library members to avoid to carry manual cards, second, one is to paste RFID tag in the books and other library resources for easy transaction and proper shelving, third one is to put electronic security gate for anti-theft system.

At present RFID membership cards are issued to the students and faculty members; they are using this card to borrow books from library. The card contains memory of 2K bits. Two RFID Reader have been purchased to read and write the information on the RFID membership cards.

At present we are using Barcode technology as well as RFID technology; we are using existing barcode label to get information from the books and other documents and RFID membership cards are used to get/load information about user. The key features and specifications of the components of the RFID

card and Mid Range Reader which we are using, are highlighted as follows.

RFID Membership Card

Figure 4 : RFID Membership Card

Technical Specification

Operating Frequency : 13.56 MHz, Supported Standards: ISO 15693-Vicinity Cards, Factory Programmed Read only Number: 64 bits, Memory(User Programmable): Minimum 256 bits Organised into 64x32 bit blocks, Simultaneous Identification of Tags: Upto 50 tags per Second (Reader/Antenna dependent), Data Retention time (at 25C): 10 Years, Case Material: PVC (Polyvinyl Chloride),White Surface Finish: Glossy, Dimensions: 85.6 (L) x 54 (W) x 0.76 (Thickness) mm (ISO 7810), Weight: 5 gms, Printability: Thermal transfer (Dye Sublimation preferred), Silk screen Tamp on (Pad on).

RFID Mid Range Reader

Figure 4: RFID Mid Range Reader

Technical Specifications

Operating Frequency : 13.56 MHz, Supported Standards : ISO/IEC 15693, ICODE , Supported Protocol : RS232/ USB/Ethernet, Read Range : Upto 45 cm for 300 x 300 mm, Baud Rate : 57600 b/s (fixed) and Flash : 64 kb.

Areas of Application

To implement the RFID technology in Engineering college we can divide the process into four areas, first issuing of RFID card to the library members to avoid to carry manual cards, second one is to paste RFID tag in the books and other library resources for easy transaction and proper shelving, third one is to put electronic security gate for anti-theft system. Fourth one is automatic Book Drop systems. The books are returned through the Book Drop facility located at a suitable place in the library; the RFID tags are automatically read and it will immediately update both patron record and library database. The Book Drop allows patrons to return the items 24 hours a day. Optionally, a conveyor sorting system for books that are returned through the Book Drop can be installed.

Proposed Application

To improve the library service, we have proposed to implement to stick the RFID tag in the library books and other resources and put electronic security gate to avoid theft of books. For this, we have called for quotations from various RFID solution companies and the quotations are analysised based on this a proposal has been submitted to the higher authority for sanction.

Probable Benefits

The implementation of RFID cards to the users is very useful to the students/staff for easy handling. It also reduces the burden of the borrowers to submit borrowers' cards at the time of borrowing books from the library. It reduces the time of the transaction and increases the reliability. It reduces the useable space and human power at the circulation counter (previously we kept several drawers to store the borrowers' cards).

Estimation

For improving the quality of service to the users, Velammal Engineering College has a proposal to implement RFID technology in all areas in the library. For this purpose a detailed study has been conducted and the requirements of components and estimate cost are given in the Table 8.

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Table 8
Cost Estimation

S.No	Components Requirements	Required Quantity	Approximate rate per item in Rs.	Total Cost in Rs.
1.	**RFID Tags:**			
	RFID Label which is to be stuck on the books and others resources.	60000	24	14,40,000
	RFID plan cards for patrons (to be used for identification card for members/patrons)	4000	45	01,80,000
2.	**RFID Reader**			
	Middle Range Reader/Antenna (For issue/return of books and writing programme on the tags with SDK)	01	34800	34,800
	Long Range Reader with walk through antenna (up to 1 meter read range with Buzzer and EAS along with SDK)	02	265000	5,30,000
	RFID Handheld Reader for stock verification	01	33500	33,500
3.	**Computers** at present our library has 20 computers + 2 numbers of high end servers	-	-	-
4.	**Software** Our institutions have RFID research centre, actually it is funded by Government of India using this centre we have made in-house software for RFID applications.	-	-	-
	Total in Rs.			22,18,300

Conclusion

In spite of the overwhelming advantages and benefits with the use of RFID technologies in Engineering College library, the main drawback is very high initial cost. Newly established institutions can not introduce RFID technology in their institutions and the maintenance also incurs a considerable amount. The RFID technology in libraries can thus eliminate significantly manual labour by optimizing the handling, processing and security of materials.

RFID technology has several advantages over the current barcode systems being used at libraries worldwide. The libraries that use RFID, promises to save time and operate more efficiently and effectively than the barcode systems. Some of the compensations of RFID over a barcode systems are that RFID tag can be used for security as well as for status control, thereby eliminating the need to attach security strips to library items; RFID systems make self – checkout faster and easier for library patrons; and RFID portable scanners can take inventory by just being passed slowly along the library shelves, without having to handle each item individually. RFID vendors, however, need to resolve some issues before libraries feel confident in adopting them and forefront the issues such as cost, lack of standardization amongst vendors and privacy.

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UGC- Infonet: An Indian Consortium Model for Higher Education

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Abstract

Application of ITC to the process of resource sharing made the consortium online. UGC-Infonet consortium is one of the land mark achievement in the field of higher education in India. It is only the possible solution to the ever growing demand for information and ever decreasing the budget to the universities. UGC-Infonet is the E-consortium, the users can access the scientific and research articles on 7x24 hour basis on their desk top. It provides around 5000 full text journals to the 150 universities in the Xth plan and planning to cover all the remaining universities as well as to the 17,000 colleges in a phased manner in the XIth plan. At present it includes 25 databases to cover all fields of higher learning of relevance to universities including: Arts, humanities and social sciences, physical and chemical sciences, life sciences, computer sciences, mathematics and statistics.

Introduction

We are living in the information age. The availability of online information and its effective use contributes to all round development of individuals and nations. Information is the most crucial input resource for development and it has been rightly said that "the future of each nation as well as that of mankind is based on, now more that ever, on information or knowledge gained rather than any other material or resources. Information leads to knowledge and in turn to innovation and development"[1] At the higher education level everyone needs advanced and scholarly literature to improve the quality of study, teaching and research. With remarkable development in the Information and Communication Technology (ICT), information resource in abundance is made available through the consortia approach on the net/online.

Scholarly journals provide basic theoretical background as well as an in put for the research at the higher education level. Because of the ICT and consortia approach for resource sharing, today majority of the research articles are available online. These online electronic journals are bargained, negotiated and acquired from the publishers and other database vendors and access for the same is enabled by the UGC-INFONET consortia on 7x24 hour basis at the desk top of the academician. The electronic journals are made available beyond the barriers of time, distance and cost.

Development of Higher Education in India

Higher education in our country has come long way since independence. The government policy and efforts for promotion of higher education have been guided by the New Education Policy, 1986 and program of action, 1992 and other policy initiatives in the 1990's.The higher education policy and program of action has been guided by five goals of which include Greater access, Equal access, Quality and Excellence , Relevance and Value based education [2]. To achieve these goals, higher education system has been liberalized, consequently more and more universities and colleges have been opened by the different state governments with the financial support and guidance from the UGC. The all round development of education in the past 60 years is tremendous and same is presented in the

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Year	No of Universities	No. of Colleges	No. of Teachers	No. of Students
1947	20	500	15000	0.5 million
2006	367	18064	4,88,000	11.2 million

following table.

The growth of education in the last 60 yearsSource: UGC- thrust and priorities of XI th Plan

From the table it is clear that the number of universities has increased from 20 in 1947 to about 367 in 2006 indicating thirteen-fold increase. The number of colleges increased from 500 in 1947 to 18,064 in 2006. similarly the number of teachers has increased from 15,000 in 1947 to 4,88,000 in 2006. and number of students increased from about half million to 11.2 million.

However, the quality of higher education has been not improved in the speed of number universities and academicians increased. To improve the standard of academic and research activity, there is a urgency of high attention from the respective agencies. The main reason is the universities across the country are facing an acute shortage of fund to support their academic and research activities. The quality of academic activities in the higher education mainly depend on the availability and access to international scientific periodical information as well as world class laboratories.

The majority of the universities across the country are facing the financial crises to subscribe these costly, scholarly, scientific and research based journals and is deprived of access to the latest published literature in their respective field. To improve the quality of education and research, the access to core and peer reviewed scientific publication is the basic requirement. The situation calls for and only available option is the optimum use of available resources through rational allocation of funds to subscribe or at least providing access to these core publications to improve the education and research activity in the universities. Thanks to developments in ICT, library consortia and licensing models, it has become possible to access online resources at more affordable price.

Library Consortia at the Higher Education Level

The consortia approach for to online access to e-resources plays an important role in the higher education level . This is really contributes to boost the academic activities viz. learning. teaching and research activities of the university education. The main advantages of the co-operative access to e-information is the minimizing acquisition cost of international scientific periodicals, consequently user satisfaction [3]. Urbano et al pointed out that cooperation among members has proven to be fairly positive because gained access to large amount of information that they would otherwise have been unable to obtain through individual subscription [4]. with regard to consortium initiatives in India, Chakravathy and Singh concluded that the efforts of UGC-INFONET and INDEST consortium will strengthen higher education system in India.[5]

UGC, INFLIBNET and E-Consortium

Professor Arun Nigavekar, Chairman, UGC set up a committee to study the possibility of setting up a consortium of universities to obtain Internet access to scholarly journals. The national negotiation committee set up by UGC recommended a number of resources covering all areas of learning. The UGC and INFLIBET extended the program in three phases to about 150 universities. It is expected that the entire university system will be covered under the program very soon. They also planning to extend this program to the 17,000 colleges in a phased manner.. Universities will become members of the consortium after signing a MOU with the UGC and INFLIBNET. The UGC provide funds for the program, which will be free of cost for the universities.

In addition to the teaching and learning, universities should support the research activities. As discussed above the quality of academic activities of the universities are mainly depends upon the availability or at least accessibility to the world class scientific articles in their respective field of research. Due to

limited resources, majority of the universities were finding it difficult to provide access to scientific and research articles to their users. In the context of more than 10,000 Ph.D.'s produced every year by these universities, the universities were badly in need of support for information sources for its users so that the quality of education and research could be improved. Further, the journals procured by these universities were duplicated, and there was no formal understanding between them for resource-sharing. Resource-sharing activity was totally localized, informal, and minimal. Even individual universities were finding it difficult to share resources between different departments due to the distance between departments and department libraries on campuses. Many universities also did not have the necessary ICT infrastructure and networking facilities, unlike premiere institutions such as the IITs and IIMs. As an apex organization, the UGC was realized the importance of the consortium and forced to work out strategies for providing increased access to information. It became more essential in the context of increased quality consciousness and competition from foreign and private institutions. As a backdrop to this situation, the UGC planned and established the Information and Library Network (INFLIBNET), which is supposed to take care of networking libraries and their resources in the higher education institutions across the country. This was established along the lines of The Joint Academic Network (JANET) in the UK.

Looking at the information needs of the users of academic institutions, the UGC has launched two ambitious programs: UGC-Infonet and UGC-Infonet e-Journals Consortium. It was difficult for the universities to raise the necessary funds to develop the network infrastructure. Therefore, the UGC-Infonet project, in collaboration with Education and Research Network (ERNET), has provided the infrastructure and also upgraded existing networks to broadband. This network initially connected a select 150 universities on a turnkey basis. They also have plans to use VSAT technology to facilitate networking for both urban and rural universities. Over a period of time, this service is planned to extend to other remaining universities and 17,000 colleges. INFLIBNET will coordinate between ERNET and the individual universities. Further, INFLIBNET maintains one print copy of almost all the journals subscribed to as a national archive[6] .UGC-Infonet E-Journal Consortium. In the process of improving the quality of higher education, the UGC decided to subscribe to e-journals and provide access to Indian universities and colleges.

The UGC has also initiated a program providing Internet access to scholarly literature in all areas of learning. The program is wholly funded by the UGC. All universities which come under UGC's purview have been provided grants to obtain Internet connectivity under UGC-Infonet and from members of this program. It will gradually be extended financial and technical support to all colleges as well.. The UGC-Infonet E-journal consortium is one of the greatest event in in the higher education and research field which has been formally launched on the concluding day of UGC's Golden Jubilee celebrations by his Excellency the President of India, Dr. A P J Abdul Kalam at Vigyan Bhawan on 28th December 2003 by dedicating a bouquet of e-journals to the nation.

With globalization of higher education and competitive research the demand for the scientific and nascent information has increased over the years. Due to scarcity of funds, libraries have been forced to discontinue the costly scholarly and scientific international journals, which have great impact on the higher education and research. In order to provide the current literature to academia, UGC has timely initiated the UGC-INFONET: E-journal consortium. It is a great boon to academia in the country, which enables them to access large number of scholarly and scientific publications from reputed publishers, aggregators and society publications. Under the consortium, about 4500 full text scholarly electronic journals from 25 publishers across the globe can be accessed. The consortium provides current as well as archival access to core and peer-reviewed journals in different disciplines. The whole program has been implemented in different phases. So far 150 Universities out of

367 Indian Universities, which come under the purview of UGC, have been provided access to these journals and it will gradually be extended to affiliated colleges as well.

ICT is a Means to Library Consortia

Today Library Consortia mainly stands on the ICT platform and facilitate online access to information at finger tips of the end users. The primary purpose of establishing a library consortia is to share all the available resources including, e-resources , online databases, books and periodicals amongst members. However, the mode of consortia approach has gone under transformation with infusion of new ICT. Today focus has been also shifting from print-media to digital and on-line environment. The emergence of internet, particularly the World Wide Web (WWW) as a new media of information delivery triggered proliferation of web-based full-text online resources [7]

UGC-INFONET E-Consortium in Higher Education

UGC is modernizing the university campuses with state-of-the-art campus wide networks and setting up its own nationwide communication network named UGC-INFONET.

The UGC-INFONET will be overlaid on ERNET infrastructure to provide assured quality of service and optimal utilization of bandwidth resources. The project is being funded by the UGC with 90% capital investment and 100% recurring cost during the X Plan period. A Joint Technical and Tariff Committee (JTTC), consisting of leading experts in the country has been set up to guide and monitor the entire project. INFLIBNET Centre, an autonomous IUC of the UGC, is the nodal agency for coordination of the UGC-INFONET and facilitates linkage between ERNET and the universities.UGC-INFONET will be a stepping stone in the process promoting the quality of higher education in several ways.

1. It will become a vehicle for distance learning.

2. It will be a tool to distribution of education material and journals to remotest of areas.

3. It will be a resource for researchers and scholars for tapping most up-to-date information.

4. It will form a medium for collaboration among teachers and students, not only within the country but all over the world.

5. It will be on Intranet for university automation.

6. It will establish a channel for globalization of education.

Primary Functions of UGC -INFONET

* Cataloging services

* Collections sharing

* Electronic content licensing

* Electronic content loading/presentation

* Interlibrary loan/document delivery

* Preservation

* Storage facilities

* Training

* Union lists/shared online catalogs

* Other: Networking all the academic institutions of the country

The E-Journals program is a cornerstone of the UGC-INFONET effort, which aims to address the teaching, learning, research, connectivity and governance requirements of the universities. The E-Journals program demonstrates how ICT can be used to stretch and leverage available funds in furthering these aims. The program has been made possible due to close understanding and cooperation between the UGC, ERNET, the Inter-University Centres IUCAA, INFLIBNET and CEC, and national and international publishers.

Subject Areas Covered under UGC-INFONET

The E-Journals program aims to cover all fields of higher learning of relevance to universities including:

* Arts, humanities and social sciences

* Physical and chemical sciences

* Life sciences

* Computer science, mathematics, statistics

The literature made available through this program includes research articles, reviews and abstracting databases. Access is provided

wherever available to both current and archival literature. Portals are also available to enable users to navigate easily through the literature.

INFLIBNET has been given a responsibility to administer and monitor the program and have independent electronic access to all the publications to help with the process. It will be provided with one free print copy of each journal subscribed under the consortium for archival purposes (by many of the publishers). A web site is designed to provide information to consortium members about the status of the program at <web.inflibnet.ac.in/econsortia/index.htm>. INFLIBNET also conduct training programs to spread awareness and to develop expertise within the university community in the use of E-Resources. Special training programs will be conducted on different university campuses by publishers of Complex databases.

Databases included in the UGC-INFONET

Today UGC-INFONET provide many publications, which includs more than 4,200 scholarly journals, are available to about 150 universities from the following organizations:

1. Oxford University Press
2. American Physical Society
3. Kluwar Online
4. Portland Press
5. Mathe Science
6. Annual Reviews
7. Blackwell
8. Taylor and Prancis
9. American Institute of Physics
10. Project Muse
11. American Chemical Society
12. Chemical Abstracts Service (CAS)
13. Royal Society of Chemistry
14. Institute of Physics
15. Cambridge University Press
16. BIOSIS
17. Nature Publications
18. Science Online
19. JSTOR
20. Springer-Kluwer
21. Encyclopaedia Britannica
22. Elsevier Science
23. Emerald
24. J-Gate
25. Ingenta

Discussions are in progress with several other publishers and their publications are expected to become available in the future. Access is available through individual university IP ranges. The remaining universities will join in phases. One-day user awareness training programs were conducted at more than 129 universities to provide orientation on the use of electronic journals and databases. Many more such programs are planned to cover all the selected universities.

While accessing the resources through the above said databases, it wants to avoid duplication of procurement of the titles by the universities as well as bargain for the best subscription rates. Initially, the UGC had subscribed to almost 2,000 e-journals, eight databases, and two portals. Through this project, the e-journals were procured with a discount of between 60 and 90 percent, and access to archival materials was included. The total budget for this project was allocated by the UGC. In due course, the UGC may collect subscription fees from individual universities With the provision of the network infrastructure, the UGC was able to provide access to e-journals. Initially, connectivity was provided to fifty universities starting on January 1, 2004, on a trial basis. It was extended to another fifty universities for the year 2005. during 2006, it has covered another 50 universities. So far it has covered 150 universities and now planning to extended to other remaining universities and 17000 affiliated colleges in a phased manner. Provision of access to e-journals is basic, but more important issues are users' acquaintance with the technology and provision of training to the users to enable them to make optimum use of the resources. Even though the e-resources provide easy and fast access for users, many universities still lack campus networks, resulting in limited access to these resources. Some of the

universities still depend on dial-up Internet facilities. However, these days, universities are building improved infrastructure that will enable access through leased lines (IP-based access).

This consortium has improved access to an increased numbers of journals. It has provided the facility for users to directly download information. However, user statistics for the first six months, from January to June of 2004, are not so encouraging. INFLIBNET has received statistics from some of the publishers, and they indicate that the total number of downloads by the member universities was 305,530, out of which American Chemical Society (ACS) journals constituted 37.65 percent. The latest statistics were not yet available but indications are that there is considerable increase in downloading by the users, due to awareness programs and seminars conducted by the universities and by INFLIBNET (Murthy et al., 2005).

It is worth mentioning that a J-gate portal is being procured by UGC-Infonet. It lists about 14,000 journals, both free and subscription based. The user can get access to full-text articles in free journals through a hyperlink. The list is being updated and more and more titles are being included.

A data center with server and storage facilities for content of common interest is being planned for the UGC-Infonet center. The universities can host their Web sites through this data center. An informatics lab was opened at the INFLIBNET center with state-of-the-art technology including wireless technology. This lab is open to faculty and scholars from various universities in the country; there is also provision for supplying photocopies of print journal articles.

INFLIBNET is also building a database of Ph.D. theses submitted to Indian universities. Even the Vidya Nidhi project based at the University of Mysore is in the process of creating a database of Ph.D. theses with financial support from institutions such as NISSAT. It may be worth mentioning that the UGC has already initiated steps for creation of a full-text database of Ph.D. theses presented to Indian universities. It prepared norms for creation of an Electronic Theses Database (ETD). The main purpose of this initiative is to provide free and unlimited access to these theses. However, implementation may take more time.

Out of the 171 universities selected for the

Status Summary	
Status	**No. of Universities**
Agreements Signed	146
Funds Released From UGC	150
PO Received by ERNET	149
Links Commissioned	149
Universities which have received training	129
Total BB VSAT Links	50
Total SCPC Links	45
Total Leased Links	54

consortia 150 universities started the UGC INFONET journals consortia in a phased manner. In the first phase 50 universities have been identified in the year 2004, in 2005 in the second phase INFLIBET has been identified another 50 universities for the consortia and in the year 2006 another 50 universities have been identified by the INFLIBNET.

List of Resources

The above table indicates that there are 25 databases, out of which, 19 are full text, two are portals and four are bibliographic databases. The royal society of chemistry database include six sub bibliographic databases. The portals gives access to full text journals as well as hyperlink to other data bases. For example J-gate portal is

FULL TEXT DATABASES	No of Journals	Website address
: American Chemical Society (31)	31	http://www.pubs.acs.org/
American Institute of Physics (18)	18	http://www.aip.org/
American Physical Society (10)	10	http://www.aps.org/
Annual Reviews (29)	29	http://arjournals.annualreviews.org
Cambridge University Press (189)	189	http://journals.cambridge.org/
Elsevier Science (34)	34	http://www.sciencedirect.com/
Emerald (28)	28	http://www.emeraldinsight.com
Encyclopedia Britannica	1	http://search.eb.com/
Institute of Physics (36)	36	http://www.iop.org/EJ
J-STOR (457)	457	http://www.jstor.org/
: Nature (1)	1	http://www.nature.com/
Portland Press (4)	4	http://www.portlandpress.com/pp/default.htm
Project Muse (222)	222	http://muse.jhu.edu/journals
: Royal Society of Chemistry (23)	23	http://www.rsc.org/
Science Online (1)	1	http://www.scienceonline.org/
Springer & Kluwar Journals (1217)	1217	http://www.springerlink.com/
Blackwell		http://www.blackwell-synergy.com/
Taylor and Fracis (1105)	1105	http://journalsonline.tandf.co.uk
Oxford University Press		http://www.oxfordjournals.org
PORTALS		
Ingenta - Gateway Portal (5400)	5400	http://www.ingenta.com/
J-Gate Gateway Portal (15000)	15000	http://www.j-gate.informindia.co.in/
BIBLIOGRAPHIC DATABASES		
Chemical Abstracts Service (1 Database)	1	http://stnweb.cas.org/
Biological Abstracts (1 Database)	1	http://web5.silverplatter.com/webspirs/start.ws?customer=c180470

being procured by UGC-Infonet lists about 14,000 journals, both free and subscription based. The user can get access to full-text articles in free journals through a hyperlink. The list is being updated and more and more titles are being included over period of time.

Open Access Journals

Today the open access free journals are also important sources of e-resources. The publications also include the research and scientific information and are equally very good source of information. In addition to the subscribed databases, INFLIBNET has provided some open access journals. The user can access these journals through the above said websites. These websites are also provide important and relevant information inputs to the academic,

General List of Open access eprints	http://dmoz.org/Science/Publications/Archives/ Free_Access_Online_Archives/
PubMed Central (PMC)	http://pubmedcentral.nih.gov/
Networked Computer Science Technical Reference Library	http://www.ncstrl.org
http://www.ncstrl.org CERN Document Server (CDS)	http://weblib.cern.ch/
Citebase	http://citebase.eprints.org/cgi-bin/search
http://repec.org/	BioMed Central
http://www.biomedcentral.com/start.asp HighWire Press Free	http://highwire.stanford.edu/lists/freeart.dtl
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http://www.doaj.org	

research and teaching paternity of the higher education institutes.

List of Subject

From the table it is clear that more than 60% of journals are belongs to the science and technology departments and it gives less number of journals to the social science and humanity subjects. More over, the majority of almost all the departments are says that the relevant and core journals in their own subjects are very less when compared to the number of journals available in the respective subject. The faculty members and research scholars are the

Subject	No. of Journals Covered	Subject	No. of Journals Covered
AGRICULTURE	39	HISTORY	221
ANTHROPOLOGY	45	HUMANITIES	26
ARCHEOLOGY	17	INFORMATION SCIENCE	19
ARCHITECTURE	9	LANGUAGE & LINGUISTICS	79
ARTS	184	LAW	61
ASTRONOMY	17	LIBRARY SCIENCE	36
BIOCHEMISTRY	1	LITERATURE	159
BIOLOGY	306	MANAGEMENT	16
BIOTECHNOLOGY	15	MATHEMATICS	192
BOTANY	39	MEDICAL SCIENCE	494
BUSINESS	43	PHILOSOPHY	124
CHEMISTRY	167	PHYSICS	178
COMMERCE	3	POLITICAL SCIENCE	153
COMPUTER SCIENCE	133	PSYCHOLOGY	147
CULTURE	21	RELIGION	55
EARTH SCIENCE	64	SCIENCES	56
ECOLOGY	7	SOCIAL SCIENCES	166
ECONOMICS	188	SOCIOLOGY	155
EDUCATION	159	STATISTICS	36
ENGINEERING	158	TECHNOLOGY	17
ENVIRONMENTAL STUDIES	93	ZOOLOGY	16
GEOGRAPHY	45		

opinion that inclusion of core journals are more useful for their teaching and research rather than increasing the number of journals which are less important in the UGC-INFONET consortia.

Conclusion

UGC-Infonet E-journal Consortium is a land mark event in the history of Indian higher education. On the one hand, it is an viable solution to meet the ever growing demand for the core scientific publications from the users and on the other, it is only available solution to the ever decreasing budget and ever increasing prices for the journals. Students, research scholars, and faculty members are able to access to large amount of information that they would otherwise have been unable to obtain through individual subscription. The only available solution in the academia is the optimum use of resources through judicial allocation to subscribe or at least to provide access to the core publications to improve the quality of higher education in the country. Today, the tremendous developments in ICT, library consortia and licensing models, it has become possible to have wide access to online resources at more affordable price than ever.

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2008 Nov. 9-12
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