Electronic Resources and
Digital Services

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Selected Papers of Bilingual International Conference on Information Technology: Yesterday, Today, and Tomorrow

19-21 February 2015

Editorial Team

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PREFACE

With the advent of technological era in 21st century, every application area, right from education to industries, have evolved in their operational paradigms and the most indispensable part of this evolution has been the embedding of Information technology (IT) wherever possible.

It is evident that IT has grown tremendously in all these years and still have a large potential not only accelerate the economic growth but also global economic development. To realize this prediction as truth, governments need to take specific measures to promote IT use and make it accessible to every section of the society, along with improving infrastructure, strengthening training and education system and flexible labor laws.

Information technology should be used as a tool to improve the living standards of common people and enriching their lives. IT literacy needs to be enhanced so that ordinary people can derive benefits, both economically and socially. Full potential of IT industry can be strained only when we realize and understand the future perspectives of the industry keeping the past and present in mind.

DESIDOC has organised 'Bilingual International Conference on Information Technology: Yesterday, Today, and Tomorrow' during 19-21 February 2015. The objectives of the Conference are to provide a roadmap which Information technology and its developers have followed in order to make it compatible with every day-to-day activities of the user.

The Conference was extensively publicized on the web and print media. More than 400 papers have been received from all over India and abroad. The Editorial Committee reviewed them thoroughly and short-listed paper based on originality, content and presentation. About 160 papers have been accepted after review and included in the Three Books entitled; Electronic Resources and Digital Services, Artificial Intelligence and Network Security,

and Managing Information Technology. With a view to involve upcoming professionals and to motivate them, it was decided to give sufficient space to them to present their views.

Book contains 45 selected full-text research papers and review papers on Librarianship, Digital technologies, Managing e-resources, digital services, User behavior, and Bibliometric studies.

Librarianship includes Four papers. These papers discussed about 100 years of library and information science, Technological challenges, digital libraries, and legal librarianship.

Digital Technologies includes Eight papers. These papers discussed about Effective retrieval, Greenstone, Automated Serial Control, Cloud Services, emerging technologies, role of Artificial Intelligence, Quick response Code, and Mobile library services,

Managing e-resources includes 11 papers. These papers dealt with Database on Plant Taxonomy & Systematic, E-books acquisition models, awareness of E-learning, Archiving of E-journals, Institutional repositories, Union catalogue of Books, Library Consortia, and Agriculture Consortia.

Digital services includes Four papers. These papers discussed about new technologies in publishing, selection of Publishing software, digital publishing and DESIDOC Services.

User behavior includes Nine papers. These papers discussed on Social web sites, Internet use, E-resources in Agricultural libraries, usage of e-resources in Chhattisgarh, AMU Aligarh, IIT Bombay, ISIS and Bengalore University.

Bibliometric Studies includes Nine papers. These papers dealt with Literature on Leptospirosis, Nanowaters, Fruit Science, Management Literature, and study of journals like; IJPER, LISTA, JIPR, DJLIT.

As the title of the Conference is 'Bilingual International Conference on Information Technology: Yesterday, Today, and Tomorrow', an attempt

has been made to provide translation of Title, Abstract, and Conclusion in Hindi language also. Some authors has provided Translation in Hindi but in most of the cases it was done by professionals.

The Editorial committee acknowledges with profound gratitude, the immense efforts of the contributors and hope that the ideas generated in these papers would be deliberated during the conference for further enriching the future application of Information technology for well being of human being.

10 February 2015   **Editorial Committee**

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100 Years of Library and Information Science Education in India: Perceptions of A Teacher

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सारांश

भारत में एलआईएस शिक्षा को बढ़ावा देने का मुख्य उद्देश्य पेशेवरों को उनके बेहतरीन रूप और गुणों को विकसित करना है जो समाज की मांगों को वर्तमान और भविष्य की मांगों से पूरी कर सकें। असल में, समकालीन जानकारी वाला वातावरण प्रदान करने में एलआईएस पेशेवरों को तैयार करने के लिए देश में एलआईएस शिक्षा कार्यक्रमों को मूलरूप से पुनर्गठित किया जा रहा है। एलआईएस शिक्षा के क्षेत्र में सालों तक बहुत से परिवर्तन देखे गये हैं। प्रस्तुत लेख में अतीत, वर्तमान मुद्दों पर चर्चा और भावी विचारों के लिए दूरदर्शी परियोजनाओं का पता लगा गया है।

ABSTRACT

The major objective of promoting Library and Information Science (LIS) education in India is to develop professionals in their finest form and attributes, who can meet the demands of the present and future knowledge society. The LIS education programmes in the country are radically restructured, as a matter of fact, to prepare LIS professionals suitable to contemporary information environment. The accomplished years have witnessed a number of changes in LIS education. The paper traces out the past, discusses the present issues and projects visionary views for the future.

Keywords: LIS Education, India, library and Information Science, University Grants Commission

1. INTRODUCTION

The LIS education in India achieved the landmark of 100 years and celebrated the centenary in 2011. The profession has a slow and steady growth and reached a state of relative maturity. Though the early years witnessed a low pace of certificate courses it got growing demand in later years and were devoted for consolidation and quality control of the LIS education. The University Grants Commission's Committees has a seminal role to play in the advancement of LIS education and the libraries. The Reports of the Commission provided a standard system of LIS education. However there is proliferation of higher educational institutions to increase avenues of learning that include LIS courses. The resultant of this growth is beneficial as it increased the demand for the courses but to some extent diluted the course. The emerging technologies also brought in radical changes in learning, teaching and professional domain. In this context there is a pressing need to evaluate the achievements of LIS education in India. It is relevant to look back at the state of LIS programmes in the past, consider its current state to identify strengths and weaknesses and reflect on the likely scenario in the years ahead.

2. THE PAST (1911- 1980s)

The American Librarian Mr W.A.Borden invited by Maharajah Sayaji Rao Gaekwad of Baroda introduced the training programme with an aim to introduce a library system in 1911. The next initiative was in 1915 by another American Librarian Asa Don Dickenson at Punjab University, Lahore (now in Pakisthan). In fact this was the first University course in India. He brought out 'The Punjab Library Premier' for teaching the three months short term part-time programmes. Gradually other universities and library associations like the Madras Library Association (1929), Madras University (1931), Andhra University (1935), the Bengal Library Association (1935), Banaras Hindu University (1941), Bombay University (1944), Calcutta University (1946), and Delhi University (1947) started the library science courses. The education and training programmes of the period underwent a sea change from part-time certificate course to full time post graduate diploma and graduate programmes. The profession attained a status with the contributions and efforts of Padmasri Dr S.R.Ranganathan, Father of Library Science in India. It was grown to its full

form with the introduction of Master's and research programmes at University of Delhi followed by Banaras Hindu University, Mysore University etc. In 1970s a good number of departments started offering the course at Masters level and renamed their courses as Library and Information Science in accordance to U.G.C.stipulation.

The virtue of this era was the University Grants Commission (UGC) Review Committee on Library Science report submitted in 1965 under the Chairmanship of Dr S.R.Ranganathan. It reported that out of 14 Universities that offer LIS education only two were independent departments and others were part of library headed by the University Librarian. It suggested measures for the improvement of Library Science education in India. The recommendations formed the basis for the LIS courses at different levels, facilitated to formulate curricula and also to maintain standards. Therefore all credit goes to Dr S.R.Ranganathan for laying a strong foundation and developing the course from certificate to research level with defined standards.

"This Committee in its report laid down for the first time in the country a detailed pattern for library and information science education. The Report in its introduction mentioned the importance of proper training for librarians; and the growing need for qualified and competent librarians in the country with the developing network of libraries, democratization, research institutions and nevertheless the planners and policy makers." (UGC-CDC, 1992)

The Committee's major recommendations include: Universities should concern only with BLibSc.; MLibSc; PhD courses; The P.G.Diloma course should be re-designated as the Post graduate BLibSc; to drop non-professional subjects from the course content.

The initiation of Associateship in information/documentation science by Indian national Documentation Centre (INSDOC, 1953) and Documentation Research and Training Centre (DRTC, 1962) contributed to strengthen the profession and produced leaders to manage special and research libraries. The 1970s witnessed the independent status to the departments with separate infrastructure and full time faculty. The course was emerged as one of the most sought after during 1970s and 1980s owing to its job potentiality. Another significant development was initiation of Master's course by majority of Universities. The landmarks of this period are the policy support and substantial public funds from organizations like UGC, AICTE, NISSAT etc. There is much emphasis on curriculum with the UGCs initiative of Subject Panels in 1980s. The Subject Panels on Library and Information Science focused equally on theoretical concepts and training in skills that would make the students effective leaders. These developments paved way for a standard LIS education that promoted attitudes and values appropriate for professional needs. Thus the U.G.C. and University departments did the necessary ground work and laid the foundations for the growth of LIS education in the country.

3. THE PRESENT (1990S – PRESENT)

The LIS education of this period can boast of producing a large workforce. It is the outcome of proliferation of institutions that offer the course in regular, distance and of Open University system. The number has increased to 78 Universities offering bachelor degree and 44 Masters, 6 MPhils, 30 PhD programmes in 1990s (UGC Curriculum Development Committee, 1993). There were 78 departments that offered the course at graduate to research level through regular on campus in Universities (69) Colleges (22) and distance mode (7) by 2000. (U.G.C. Report of Model Curriculum, 2001). Kishan Kumar and Jaydeep Sharma (2009) listed the number of LIS schools as "146 library schools (85 university level library schools, 27 universities offering library and information science courses through correspondence or distance education and 32 colleges and institutes conducting library and information science programmes and two institutes namely NISCAIR (formerly INSDOC) and DRTC that offer two year Associateship in Information Science). 120 universities are offering bachelor's degree; 99 offer master's degree including 21 universities that conduct two years integrated master's degree programme; 18 offer MPhil degree; 63 offer PhD degrees".

3.1 Committees and Their Recommendations

Report of the Curriculum Development Committee in Library and Information Science (1993) (Chairman: Prof Kaula): The Committee besides working out on a detailed curriculum for BLIS and MLIS courses made through study of the then existing situation and recommended for:
- Admission test and interview at the entry level for BLISc and MLISc
- Workshop cum information processing laboratory and library with adequate collections
- Teaching methods, teaching aids and faculty strength
  UGC Model Curriculum: Library and Information Science (2001) (Chairman: C.R.Karisiddappa): significant recommendations:
- Two year MLISc course eliminating BLISc and MLISc (1+1) stream.
- Suggested model curriculum for LIS
- Modular approach to curriculum as a flexible structure with a ratio of 80:20 i.e. 80% from UGC Curriculum modules and 20% emphasizing the local needs.

- Adequate infrastructure that include practical tools at the ratio of 1 tool for two students (1:2); good collection of reference sources both print and electronic; I.T. laboratory with network facility at the ratio of 1:5 (1 terminal for every five students)
- Improvement of teaching staff strength based on previous Committees recommendations
- Appropriate restructuring of training programmes for teachers

The recommendations of the Committees were incorporated in LIS curricula of various universities in general. A number of conferences/ seminars held by IATLIS, ILA, IASLIC focusing on the curriculum as theme supported the revision and revamping of LIS curricula.

Another significant document during this period is National Knowledge Commission's 'Libraries: Gateways to Knowledge' that categorically recommended national institute for advanced training and R&D (suggested name: Indian Institute of Library and Information Science). The recommendations of the Commission on LIS education categorically stated:

- Revamp LIS Education, Training and Research facilities: The proposed Mission/Commission on Libraries must assess as soon as possible the manpower requirements of the country in the area of LIS management, and take necessary steps to meet the country's requirement through LIS education and training. To keep the LIS sector abreast of latest developments, necessary encouragement should be given to research after evaluating the research status in this field. Establishing a well equipped institute for advanced training and research in library and information science and services would provide the necessary impetus to this task.
- Indian Institute of Library and Information Science (ILIS):
  - To offer training programs in relevant areas and to conduct continuing education programmes (including training of trainers) for the library and information professionals.
  - To identify, sponsor and conduct R&D programmes in the field of Library and Information Science, including newly emerging research areas. Among the areas needing immediate R&D, the following were identified by the Working Group:
  - Cross Language Information Retrieval with an emphasis on information in Indian Languages
  - Standardisation of Indian names
  - Vocabulary control over Indian subjects developed in terms of multi-lingual thesauri and subject heading lists

- Development of open source software
- Development of Digital Libraries, both in English and Indian languages
- Technical standards for Indian scripts, Optical Character Recognition (OCR) for Indian scripts, and search engines which can implement stemming algorithms for Indian languages
- User needs and reading habits for different groups
- Organisation of community information and development of appropriate standards.

The recommendations of the National Knowledge Commission on LIS education are not implemented so far though the individual departments have taken initiatives to revamp their curricula.

4. PRESENT SCENARIO

The departments/University, the student, the Library managements are the stake holders in the process of LIS education, training and employability. The following paragraphs present an overview of the scenario in terms of the stake holders.

The Departments: The LIS Departments are working to bridge two influential groups - one is LIS students, who join the course for employment opportunities as librarians, information and knowledge managers; the other is library employers who are anxious over the competencies and skills of the graduates. Their basic idea is to improve quality of education and produce excellent products that are readily lapped by the employers.

A significant factor is the increase in enrollment in campus, off campus or distance education modes. Further open and distance learning (ODL) in LIS lead to the proliferation of qualified professionals. Therefore quantitative growth of LIS programmes is visible than the quality. The University departments, with the exception of some notable ones, have however, not been able to maintain the high standards of education or keep pace with developments in the field. Over a time, financial constraints with exploding enrolments have led to the deterioration of quality of students at the entry as well as outcome levels.

The use of electronic devices in libraries have a direct impact on the curricula as the departments are bestowed with the responsibility of developing professionals with technological skills from time to time. The LIS curricula responded positively to the demand and ICT component has been given prominence in theory and practice. However the lingering issue is lack of well equipped IT Laboratory.

The individual departments have adopted their own teaching programmes and methods and intelligent use of teaching devices for the purpose that varies from one department to another. Ample opportunities have

been provided for faculty under continuing education programmes through UGC Academic Staff College Refresher/Orientation programmes; Faculty Improvement Programmes (FIP) of UGC; conduct of conferences, seminars and workshops. However the major issue is diminishing faculty members in the departments owing to non filling of vacant positions.

National Accreditation and Assessment Council (NAAC) has been established under UGC with a purpose to carry out periodic assessment of universities and colleges. However this is for the University as a whole and not for the individual departments.

The employers: However the library professionals/ employers do not seem to be happy with the outcome of library schools as indicated in the literature and discussions on LIS forums. It is obvious from the management of University libraries by non professionals. It is a general observation that 50% of University libraries do not have professional librarian. It is a fact that there are a number of professionals qualified with PhD degrees and experience. Still the employers express non competency. What are the expected competencies? Professional? General? Soft skills? Managerial? Technological? If all, to what extent of each? Certainly a competency map is required. Yes a map that directs competencies required at entry level and outcome level that clearly indicates what to be done at the course level.

The student: The major feature of the present LIS courses is phenomenal growth in the number of institutions imparting LIS education in India. In ILA 1996 Presidential address Krishan Kumar observed "At present we are over producing professionals. The result is that unemployment is increasing at a fast pace. This is a disturbing trend. …The emphasis should be to improve quality of training and education, keeping in view the competencies (knowledge, attitudes, skills etc)."

A similar observation was made after 15 years by Jagtar Singh and I.V. Malhan (2010). "In the context of LIS education, expansion and inclusion is not a problem, but quality of LIS education, research, and training is a lingering issue that demands immediate attention. Only a very small percentage of LIS students who appear in National Eligibility Test (NET) and State Level Eligibility Test (SLET) clear these examinations for pursuing research and seeking professional jobs. This amply speaks of the quality of LIS education. Unplanned expansion of LIS schools and lack of professional accreditation are the major reasons for lack of quality education, research and training."

Mediocrity is a cause of concern in student enrollment. Owing to the low image of the profession, though the status and salaries are in accordance with the teachers and scientists in respective institutions, the LIS education is not a choice for creamy layer students. Of course wider opportunities for professional courses like engineering, medicine, management, accountancy is also the causative factor for this situation.

Thus the present status of LIS education is a picture of bright and dark shades. Certain lingering issues in the present LIS education are:
- The demand for the course is diminishing due to low profile/image of the profession at large. As a result students with mediocrity entering profession coupled with the problem of regional language and differential skill.
- Though the curriculum converge theory and practical components and reflects the contemporary information environment, the missing aspects are the content transferable skills, competence, critical thinking, practical skill etc.
- The elective/optional offered are usually institution or system oriented like academic, public/community, special, corporate, agriculture information systems. As a matter of fact many of the electives are listed but not opened due to shortage of faculty.
- Research orientedness, the essential component of Project work at Master's level, is lacking and it is an undisputed fact that the outcome is not encouraging.
- While course content has been updated and restructured over time, teaching methods are not encouraging owing to inadequate faculty, both qualitatively and quantitatively.
- Infrastructural facilities range from inadequate to dismal. Classification and cataloguing tools are either outdated or inadequate and computer laboratories and communication lines are inadequately stocked, leading to poor teaching.
- The chronic oversupply resulting in unemployment of graduates and there is mismatch between the actual work culture and quality of supply.

The need is to imparting quality education in subject areas of contemporary relevance that can bring in better image and job opportunities. Quality can be ensured only if there is sufficient competition among institutes to attract talented students and provide choices and innovative subject combinations. To devise such programmes reengineering of LIS courses with vision for short and long term programmes is necessary.

5. THE VISION

We can see ahead a changing landscape, and the going is uncertain. What is important at this juncture is how the LIS education responds to the revolution in the professional environment with certainty. So we have to move ahead planning and reassessing how we go about with our activities. LIS is a skill-intensive sector, which calls for greater efforts in planning and

implementing various courses to develop knowledge managers. A new strategy for meeting this challenge needs to be evolved with complete policy commitment on the part of the University and the Department. The vision statements should put through the needed reforms with full commitment and conviction spurred by desire.

5.1 To Set Standards for LIS education

Educational standards serve as basis for uniform provision of educational programmes and define the expected outcome of the knowledge and skills students should possess. Even after 125 years, American Library Association is still a force on LIS education and in maintaining standards in USA. There is a dire need for such a body in India for LIS education. With globalization, there is a great need to provide a platform for gradual integration of our degrees with the best available in the world. This facilitates mobility of skilled professionals in a knowledge-based society. There are Indian educational institutions entering into partnerships with established foreign universities and institutions to offer well structured professional courses in business management and media studies. Are we ready for such high profile LIS courses?

LIS education programmes have to aim at and work out for achieving the target. Indeed standards are the pre requisite to achieve the target. "In the Indian situation, it is not merely the right kind of curricula that is required to match the market opportunities, more we require set global standards at the national level for very high quality education…." (I.V.Malhan, 2009).

Insofar as admission standards are concerned a standardized admission testing has to be introduced at the state or national level to test the attitude and aptitude of the entrants towards the profession. This is essential to bring in some commonality in admission procedures and standards.

5.2 To Produce Employable Professionals

Employability is associated with gaining academic and practical intelligence and the capabilities to apply the same to the work environment. What the employees looking for? The employers concentrate not only on the academic part but also on interpersonal behaviour, team spirit, analyzing situation and problem solving. Talent acquisition in terms of hard, soft and life skills is what they are expecting. Therefore the LIS education and training should reflect these aspects.

Further, continuous learning is a must in today's situation. After employment the recruits should constantly upgrade their skills to stay afloat in the ever-changing digital era as the employers expect a lot of higher value of work from them. There is lot of difference between recruitment 10 years before to recent times and 10 years after. The professionals must develop versatile skills and ready to adapt to changes.

However as Steig (1992) puts it the students back ground plays a major role in shaping him as a competent professional.

"Information professionals are the product of the totality of their education and experience. The time spent at the school of library and information science is the final stage of preparation. This … year(s) of higher education enables graduates to use previously acquired knowledge in a particular way, but it alone does not create information professional. It builds on the incredibly variegated educational foundation provided by family, schools and colleges. How these institutions have defined their tasks, the knowledge they have imparted, the skills they have developed, and the values they have fostered determines what the school of library and information science can do".

Therefore how the LIS departments prepare a student entering to the course with variant backgrounds, as information professional with equal opportunities is always a matter of challenge. Unfortunately, there is no cogent plan or scheme on how we could continue to meet the challenge of providing the skilled manpower that is required by various sectors of the society. The LIS academic community has to understand the way in which the profession is currently looking at competency and skills. They have to shift focus from training based culture to learning based culture. It is time to concentrate on some tailor-specific courses rather than generic courses.

5.3 To Revamp LIS Curricula

Competency and adoptability in managing information and in utilizing advancing technologies are the primary objectives of the curriculum. There is need to deal the course components beyond the introductory level and give an in depth and comprehensive knowledge base to the students. To be effective the existing curricula has to reflect the following aspects:

• The curricula has to include study and training skills to manage knowledge resource centres of academic, corporate and business sectors and expertise in handling virtual and print information resources so as to make the student capable to practice the profession independently. Chances are for those with right set of skills to move in a different direction, enhancing the profession and personal career and enjoying the challenges.

• The electronic environment provides an opportunity for libraries to design new activities. Hence the course content needs to focus on network navigation skills like e-publications, digital downloads; work in a consortia environment; sophisticated searching

of digital material; e-serial aggregation; maintaining alerts to current publications; use a variety of search engines and reference sources available on the Web, inclusive of Invisible Web and preparation of subject specific products.

- The curricula are expected to be student centered and introduce problem – based learning to impart subject knowledge, research, analysis and consultancy skills in developing and maintaining new products and services like: embedded information literacy training modules; open access institutional repositories; webliographies, value added aggregator services, connecting the user with customized services separating wheat and chaff.

6. THE WAY OUT

The vision can be achieved if a path is formulated. The following suggestions may be considered while laying a path to reach the vision.

- Modular/credit based course is a better option as the students will have a chance to select the courses of their interest.
- Introductory/foundation courses of at least one month duration are necessary after admission to prepare students to study the course effectively. The aim is to orient student with basics of library profession and ethics, library work environment, computer and communication skills.
- The innovative new curriculum has to be structured to facilitate horizontal and vertical integration between subjects and blend theory and practice.
- Building competency based modules that would add professional and analytical skills and enhance the decision making power.
- The syllabi needs to include new elective courses having assured job market that may be offered as credit/choice based/cafeteria courses even for students from other disciplines. For example: Records management, Information consultancy, Information Audit, E-Publishing and information processing, Data security, Development of digital repositories.
- Restoring the importance of internship and practical exposure is essential for competency development. An early exposure to library working environment is desirable.
- Well devised curriculum and planned infrastructure will not yield the expected outcome from the students unless the 'process' i.e. teaching takes place effectively. There are lapses in the existing teaching methods that are evident by the mediocrity of products of LIS departments. Hence there is need to reengineer the teaching methods. Team – teaching by sharing the intellect and infrastructure available on campus will certainly bridge the existing gap. Such aligned teaching will motivate the student and trap him within the circle of learning. Finally, faculty exchange programmes within the state will facilitate optimum utilization of expert faculty.

- The E-learning system is now available for various courses as is powered by interactive and participative virtual communication tools like blogs, discussion forums, wikis etc. For example, e-Gyankosh and e- PG pathshala supports LIS courses. However there is limited use of them on campus teaching. Hence the teaching should be a blend of the best of the both streams of learning environments. The teacher has to make it more interactive for e.g. through discussion forums, chat rooms, blogs, if necessary through personal mails and ensure a learner driven, learning – teaching – evaluation process. Such courseware facilitates the student's understanding of the subject, its structure, analyzing current practices through active learning and critical thinking skills.
- Parallel courses may be offered by the departments to facilitate both fresher and working professionals. The departments with sound infrastructure facilities may consider the 'finishing school' concept in the form of 'supplementary/add on courses'.
- Continuous development of knowledge and skills is required for performing the role of competent and effective teacher, researcher and mentor. UGC has initiated refresher courses/orientation programmes for faculty to sensitize teachers about new concepts and teaching and assessment methods. However they may not be adequate with the vast and rapid developments in digital and networked environment. There may be summer courses offered by well equipped LIS departments/ libraries in the country on emerging special and super specialty aspects that include ample practical exposure.
- Partnership between departments and libraries has the potential to develop a student beyond the curriculum. The collaborative approach helps to overcome the equity limitations and prepares the student for entry into the field.

7. CONCLUSION

The LIS departments are on the verge of identity crisis. It is high time for the LIS departments to think about their sustenance as the demand for the course is diminishing. To avoid 'wither away' chances, they have to initiate innovative courses. Today's challenging digital environment demands LIS graduates with skills in handling and retrieval of information in any format; communication and presentation; planning and problem solving; social development and interaction. There is competition to put our student's head and shoulders

above many others. Maintaining competitiveness will lead to quality of performance. Such targets can be achieved through well defined vision and mission. The vision of LIS education for the next decade is to develop professionals who are committed to excellence, ethical, responsive and accountable to community, and profession; he/she should be a lifelong learner committed to continuous improvement of skills and knowledge. The mission is to make the employers understand and accept the LIS professionals as knowledge management professionals. Indeed there is no dearth of ideas and proposals or vision and mission about LIS education in India, but the problem is with uniform implementation. "Hence, there is a need to develop strategies with consensus at national level that helps recombine points of strength in a synthetic framework and work to overcome the weaknesses and the flaws, both of macro-structural and micro-analytic approaches. The call is for commitment to build quality library education programmes that reaffirms the historic role of university departments." (Varalakshmi, 2007).

निष्कर्ष

एलआईएस विभाग अपनी पहचान खोने की कगार पर हैं। चूंकि इस पाठ्यक्रम की मांग धीरे धीरे कम होती जा रही है इसलिए अब एलआईएस विभागों को अपनी आजीविका के बारे में सोचने का समय आ गया है। 'मुरझाहट' वाले अवसरों से बचने के लिए उन्हें नवीन पाठ्यक्रमों को आरंभ करना होगा। आज के डिजीटल वातावरण चुनौतियों से निपटने के लिए किसी भी प्रारूप में कुशलता के साथ जानकारी की बहाली में स्नातकों, संचार और प्रस्तुति, योजना और समस्याओं का सुलझाना, सामाजिक विकास और बातचीत की जरूरत है। कई दूसरें लोगों पर हमारे छात्रों की जिम्मेदारी डालने की प्रतिस्पर्धा बनी हुई है। प्रतिस्पर्धा बनाये रखने के लिए प्रदर्शन की गुणवत्ता को बढ़ावा मिलेगा। इस तरह के लक्ष्यों को दृष्टि और मिशन के माध्यम से अच्छी तरह से परिभाषित करके हांसिल किया जा सकता है। अगले दशक के लिए एलआईएस शिक्षा की परिकल्पना पेशेवरों को विकसित करना है जो उत्कृष्टता, नैतिकता, उत्तरदायित्व, समुदाय के प्रति जवाबदेही के लिए प्रतिबद्ध हों और पेशेवरों, पुरुष/स्त्री को कुशलता और ज्ञान के निरंतर सुधार के लिए आजीवन सीखने के लिए प्रतिबद्ध होना चाहिए। शिक्षा का लक्ष्य नियोक्ताओं को समझदार बनाना है और एलआईएस पेशेवरों को ज्ञान प्रबधन पेशेवरों के रूप में स्वीकार करना है। दरअसल, भारत में एलआईएस शिक्षा के बारे में विचारों, प्रस्तावों, परिकल्पनाओं

और लक्ष्यों की कोई कमी नहीं है, लेकिन समस्या कार्यान्वयन में एकरूपता की है। ''इसलिए राष्ट्रीय स्तर पर आम सहमति के साथ एक रणनीति विकसित करने की आवश्यकता है जो सिंथेटिक संरचना में शक्ति के पुर्नगठन में मदद करने का काम करे और सूक्ष्म संरचानात्मक और सूक्ष्म विष्लेणात्मक दृष्टिकोणों की कमजोरियों व खामियों पर काबू करे। यह गुणवत्ता पुस्तकालय शिक्षा कार्यक्रमों का निर्माण की प्रतिबद्धता के लिए एक आवाहन है जो विश्वविद्यालय के विभागों की ऐतिहासिक भूमिका की पुष्टि करता है।'' वरलक्ष्मी, 2007।

REFERENCES

1. Jagtar Singh, Malhan I.V. LIS education in India: Trends, issues and mplications. *In* Emerging challenges and Lingering issues in LIS education, research and Training, IATLIS 2010 ed. by Jagtar Singh and Trishanjit Kaur. IATLIS, Panjabi University, Patiala.

2. Krishan Kumar. Challenges of 21st century issues in librarianship. 2nd ILA Diamond Jubilee Memorial Lecture at XLI Al India Library Conference, 1996, Vijayawada.

3. Malhan, I.V. Exploring the opportunities in the emerging information environment for transformation of LIS Education. In Envisioning employable LIS courses in developing countries for the emerging Knowledge Society, IATLIS 2009 ed. by Jagtar Singh and Trishanjit Kaur. IATLIS, Panjabi University, Patiala.

4. National Knowledge Commission Libraries, Gateways to Knowledge. New Delhi, National Knowledge Commission, 2007.

5. Steig, Margaret F. Change and challenge in library and information science education. Chicago, ALA. 1992.

6. University Grants Commission. Report of the Review Committee on Library Science in India. U.G.C., New Delhi, 1965.

7. University Grants Commission. Report of the Curriculum Development Committee in Library and Information Science. U.G.C., New Delhi, 1993.

8. University Grants Commission. UGC Model Curriculum: Library and Information Science 2001. U.G.C., New Delhi, 2002.

9. Varalakshmi, R.S.R. Need for national consensus on library and information science education in India. *DESIDOC Bulletin of Information Technology,* 2007, **27**(2), 13-20.

पुस्तकालयों और पुस्तकालयाध्यक्षता में तकनीकी विकास की चुनौतियों
Challenges of the Technological Developments to the Libraries and Librarianship

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सार

तकनीकी विकास और सूचना संचार प्रौद्योगिकी (आईसीटी) में उभरते प्रचलन ने पुस्तकालयों और पुस्तकालयाध्यक्षता सहित हर क्षेत्र एवं पेषे में सशक्त प्रभाव डाला है। पुस्तकालय पेशेवरों को सूचना की बड़ी मात्रा का प्रबंधन के साथ उपभोक्ता की उम्मीदों और विविध सूचना जरूरतों को पूरा करना होता हैं। वर्तमान आलेख पुस्तकालय प्रबन्धन में प्रचलन और अभ्यास में होने वाले बदलाव और पुस्तकालय पेशेवरों में इन बदलावों से सहयोग करने के लिए नए कौशल और दक्षता की आवश्यकता की समीक्षा करता हैं।

ABSTRACT

Technological developments and emerging trends in Information Communication Technologies (ICT) have made drastic impact in every field and profession including libraries and librarianship. The library professionals have to manage a large amount of information as well as serve the users having high expectations and diversified information needs. The present article tries to give an overview of the change of trends and practices in the management of libraries and the requirement of new skills and competencies by the library professionals to cope with these changes.

Keywords: Librarianship, ICT, e-Resources, multimedia, social media, databases

1. INTRODUCTION

The libraries in the past have been considered as the storehouse of books and documents. The introduction of dot-com in 2001 brought about new ways for people to participate on the Web in the form of new social tools. The people began to use the Web not only to find information, but also started using other applications and services like chatting, sharing photos, participating in forums, contributing ideas and building communities. Social networking websites like *Flickr*, *YouTube*, *MySpace*, and *Facebook* have all redefined social interactions on the Web. The Web has now become an integral part of the average person's social life. It has changed the people's way of thinking and communicating with one another, deepening their dependence on the Web. All these new information technologies have totally changed the needs and expectations of the users creating a big challenge to the library and information science profession to serve their users up to their expectations. Once a supplementary tool or an assistive technology, online learning now is emerging as a fast, convenient and contemporary tool for the students and teachers. Tablet PCs and availability of books on the digital platform from across the world have fuelled the growth of e-learning all over the world. With the adoption, acquisition and provision of services and resources like e-journals, e-readers, audio books, podcasts, online catalogues, wi-fi, web pages, alerts and apps the libraries are drastically transforming into hitech centers of information and knowledge. Multimedia rooms with access to numerous audio and video resources are a regular feature in most libraries. Many publishers have turned to manufacturing online educational contents. In the present time of fast technological developments, it has become essential that the library professionals should possess the skills and techniques to exploit the new technologies and advancements to satisfy the needs of the users. Libraries have to adapt and adopt changing paradigms to contribute significantly to strategic institutional goals. Libraries everywhere are reinventing themselves as social spaces too, which seems to be doing the trick of getting more people to actually visit one.

2. CHANGE OF TREND IN LIBRARIANSHIP

Librarianship may be described as the professional activity and skill of selecting, acquiring, processing, preserving, and making information available for fast and easy retrieval by way of assisting and instructing users in every possible manner to identify, locate, access, and use it. Conventionally, the libraries were considered as a storehouse of books, magazines, newspapers and other documents. With the emergence of new technologies and extensive use of ICT, the libraries have got transformed into digital and virtual institutions of information and knowledge. The format of documents has changed from paper to electronic and the information is now also extensively available in various media like CDs and DVDs. The librarianship is now facing a dual pressure of acquiring and processing of information in the form of both the print as well as electronic and making its easy and convenient retrieval to the users according to their needs and requirements. Today, the libraries are emerging as information and knowledge resource centers, performing all the housekeeping activities like acquisition, cataloguing, serial control, and circulation electronically in an automated environment using convenient integrated library management software based on their requirements. Besides print journals, the libraries have now also acquiring full-text e-journals and databases either directly as per their needs and requirements or by way of membership of an e-journal consortium. The library professionals dealing circulation service have to deliver a wide range of information products and services to meet the varying needs of their users in both online as well as offline manner. The library professionals have to now act as facilitators of the users to ensure access of the users to the best electronic sources and resources offered and available in the library. Document delivery service through e-mail and Internet has also become a part of professional service of the librarians.

The library professionals dealing with the reference services are now not only directing the users for service points in the library, but they are also delivering reference services to a large clientele through remote access by using various social media services and tools like blogs, chatting, SMS, etc. A large number of libraries are now using their websites for providing electronic services to its users, which is at present available inside the institutions through Intranet because the consortiums are providing access to full-text documents on the basis of configured IP addresses of the institutions.

Librarians are no more simply custodians of reading material, but they are the collectors, evaluators and disseminators of various types of information. Based on the requirements, new designations of library professionals have emerged like, Information Managers, System Managers, Information Scientists, Cyberarians, etc. They have now also been entrusted with the responsibility of the security of the various electronic resources acquired by the libraries. The librarians should now equip themselves in the ICT skills and keep on refreshing them with the advent of new technologies in the profession. To update their skills, the library professionals must keep a track on what is going on with the web by consulting a variety of different sources like, websites, blogs, news, tweets, etc.

3. COMPETENCIES REQUIRED BY THE LIBRARIANS

To meet the changing paradigm of education, learning and the needs of library users, the librarians are required to continuously enhance their knowledge, competencies and skills in the use of emerging technologies in order improve their efficiency and services. They need to acquire in-depth knowledge of print and electronic information resources and their management in order to meet the strategic information needs of the users. The types of competencies and skills, which a library professional must possess in the present day scenario of technological developments, are as follows:

3.1 Collection Development Skills

Collection development is considered to be a highly challenging task because of the requirement that it should not only meet and serve the needs of the current users but also be capable of catering to the future ones. Hence, the librarians are required to have thorough knowledge of the wide range of both print and electronic learning resources along with the knowledge of their contents. The librarians should also be able to identify and select the best out of the sea of the various available information resources relevant and usable for their clientele.

3.2 Collection Processing Skills

This is also one of the critical activities and skills, which a librarian should possess. The librarians need to be competent enough to analyze and evaluate the information resources and processing them in such a way that they users could retrieve and get their required and relevant information in shortest time period. This requires proper integrating and condensing of the information resource through logical and analytical approach of the librarians.

3.3 ICT Skills

These are the basic set of skills and competencies without which a librarian totally handicap in the present times. There is not a single area of library

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profession, which is left untouched by the application of ICT. The librarians must possess enough skills to profitably utilize the emerging trends and developments of ICT by acquiring minimum skills of operating and maintaining a computer system, knowledge of handling of integrated library management software, and knowledge of communication network along with basic knowledge of LAN, WAN, and MAN. Moreover, they are also required to be competent enough to fetch maximum benefits for their users out of the various library networks and consortia like, INFLIBNET, DELNET, INDEST, etc.

3.4 Information Retrieval Skills

The library professionals should be able to think and analyze in a logical manner to be effective in search the various databases available and subscribed by the library. They should be competent enough to help the users with comprehensive retrieval of information from various sources, providing retrospective search, and selective dissemination of information (SDI). They must also possess skills to guide the users in the quickest retrieval of the relevant information.

3.5 Information Repackaging Skills

One of the important functions of the librarians is to provide value-added services to their users. For this purpose, the librarians have to be proactive and well aware of the interests and needs of their clientele. They should have to be skillful in carrying out searches across wide range of information resources, downloading the relevant results, analyzing and repackaging them as per the suitability of the requirements of the clientele. They are also required to possess the skills to develop specialized information products such as databases of in-house documents, searchable full-text document files, and getting them uploaded to the webpage of their library or the institution for the purpose of their wide access and use.

3.6 User Education Skills

It is the duty of the librarians to educate their users in order to equip them with the needed skills enabling them to make fruitful use of libraries, their resources, by organizing lectures, orientation programmes, practical sessions, printed guides, demonstrations, etc.

3.7 Staff Education Skills

The librarians should support the library staff in developing their skills to cope with the challenges of the emerging technologies enabling them to serve the users effectively and efficiently. For this purpose the librarians may either attend/hold workshops, seminars, training programmes or the like in their libraries or encourage the library staff to attend such programmes at other places where they are organized. The concerned library staff after attending the programme should then be asked to train other colleagues in the new skills so acquired. This is very useful method in keeping all the staff up-to-date in the profession.

3.8 Technology Acquisition Skills

The technology is changing at a fast speed making the earlier technology obsolete. Major developments, improvements and innovations are taking place on daily and weekly basis in the machinery and equipments used in information technology. The librarians are required to be capable of locating information about the current technology trends and developments and acquiring the latest technologies suitable to serve the needs and requirements of their users. They should also have skills and competencies to discuss and bargain with the vendors and making decisions regarding the acquisition of the relevant technology or software.

3.9 Management and Interpersonal Skills

The role of a librarian is full of responsibilities. He/she is required to coordinate and supervise the work of the library staff, communicate with the staff and the authorities, leadership, etc. Thus for the efficient workflow and proper functioning of the library, the librarian must possess skills of planning, designing, developing, and implementing. He/she is required to be a confident professional having strong flair for efficient team work with excellent communication and interpersonal skills for the development of the library and library staff. He/she is also required to be an efficient problem solver.

4. CONCLUSION

With the rapid growth in the Information and Communication Technologies (ICT), the information environment within which libraries find themselves is continuously changing. These changes offer great opportunities for progressive libraries to reach out far beyond the boundaries of their buildings and websites, and to engage with an increasingly literate body of information consumers. The new techniques and technologies, which are emerging, are suitable for deployment in the libraries, to enhance the ways of making their data work for themselves and their clients/users.

At a time when universities are cutting budgets and space for libraries, it is imperative to diversify the purpose of this knowledge repository to make it indispensable. The meaning of learning should not be restricted to just books. A library's catalogue should be diversified to include multimedia and e-resources. Despite all these innovations, technology only remains a tool,

not a solution. If attitudes of libraries, librarians and management do not change, no amount of technology can help libraries feature as an option in an information-seeker's mind.

निष्कर्ष

सूचना संचार प्रौद्योगिकी (आईसीटी) में तेज वृद्धि के साथ, सूचना के वातावरण जिसमें पुस्तकालय खुद को लगातार बदल रहा है। ये बदलाव विकासशील पुस्तकालयो को उनकी इमारतो और वेबसाइटों की सीमा से बाहर तक पहुँचने और सूचना साक्षर उपभोक्ताओं को आकर्षित करनें में बडे अवसर प्रदान कर रहे हैं। पुस्तकालयों में तैनाती के लिए उपयुक्त उभरती हुई नई तकनीकों और प्रौद्योगिकियों के उपयोग से खुद और अपने ग्राहकों उपयोगकर्ताओं के डेटा कार्य के लिए रास्ते प्रशस्त करने हैं।

जब विश्वविद्यालय पुस्तकालयों के बजट और क्षेत्र में कटौती कर रहे हैं तब ज्ञान भंडार के उद्देष्य में विविधता लाना आवश्यक है। ज्ञान प्राप्ति को सिर्फ किताबों तक ही सीमित नहीं किया जाना चाहिए। पुस्तकालय सूची में मल्टीमीडिया और ई–संसाधनों को भी शामिल करना चाहिए। इन सभी अविष्कारों के बावजूद प्रौद्योगिकी केवल एक उपकरण है, समाधान नहीं। यदि पुस्तकालयों, पुस्तकालयाक्षक्षों और प्रबंधन नजरिए में बदलाव नहीं करते हैं तो कोई भी प्रौद्योगिकी सूचना जिज्ञासु के मन में पुस्तकालय एक विकल्प के रूप में स्थापित नहीं कर सकती।

REFERENCES

1. Vasishta, Seema. ICT and librarians: surviving the challenges of the technological developments. *J. Indian Library Association,* 2012, **48**(2), 36-40.
2. Singh, R. & Singh R.K. Competencies and skills for university library and information professionals in 21st century. *Herald of Library Science,* 2003, **42**(3-4), 185-191.

शिक्षा में नवोन्मेश : डिजिटल पुस्तकालय
Innovation in Education : Digital Library

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सारांश

कई वर्षों से शोधकर्ताओं एक प्लेटफार्म प्राप्त करना चाहते है जिसके कारण वे विश्व से जुड सके ताकि विभिन्न विचार, सिद्धांत, अवधारणा और सूचना प्राप्त हो सके और यह सब डिजिटलकरण से संभव हुआ हैं जिसके कारण डिजिटल पुस्तकालय का आगमन हुआ। डिजिटलकरण एक रास्ता है जिसमें हम दस्तावेज, ध्वनि, सचित्र या रेखाचित्र डेटा को डिजिटल प्रारूप में बदलता हैं। यह न केवल समय बचाता हैं अपितु सांस्कृतिक विरासत का रक्षक भी साबित हुआ हैं। इस गोधपत्र में हमारा लक्ष्य डिजिटल पुस्तकालय शिक्षा प्रदान करना और षिक्षा प्रणाली के स्तर के बढ़ाने को प्रोत्साहित करना हैं। हम कुछ रास्ते प्रस्तानि करते हैं जिससे डिजिटल पुस्तकालय के विकास में होनी वाली मुसीबतों को एक बड़ी हद तक कम किया जा सकता है। इस शोधपत्र से हमारा लक्ष्य लोगों में डिजिटल पुस्तकालय और इसकी उपयोगिता के बारे में जागरूकता फैलाना हैं।

ABSTRACT

From many years researchers aimed at achieving a platform from where they could connect to the world so as to have different ideas, theories, concepts and information and this has been made possible by digitization which led to the arrival of digital library. Digitization is a way in which we convert the document, sound, pictorial or graphical data in digital format. This not only saves time but proves to be a savior of the cultural heritage .In this paper we aimed at providing a study of digital library education and encouraging the same so as to raise the level of education system. We have proposed some ways in which the troubles we faced in developing digital library could be reduced to a greater extent. Through the paper we aim at spreading awareness amongst people regarding digital library education and its utility.

Keywords: Digital library, digital library education

1. INTRODUCTION

Education is in a phase of knowledge revolution because of the ever growing needs of human. From early times humans had a habit to record and store the data and information, initially it was used to be in handwritten format in the form of carvings on stones leafs or books, scriptures and many more but nowadays we are storing this information in digitized formats which provides us with better accessibility and preservation of data.

2. WHAT IS DIGITAL LIBRARY?

Digital library is basically collection of data in digitized form .This may be available on the internet or in optical storage devices in cod s, pen drives, and floppy disc. Nowadays data is converted from classical books to electronic format so that it is globally available to a large section of society .There are different formats in which this digitized data can be made available like the HTML and PDF.

On the internet, through the digital libraries we access the plain text data, videos, pictures .sound at a very good speed .This data available can be updated regularly .Its less tedious and more informative.

In optical storage device data can be accessed at a much faster rate than that through the internet. Due to smaller size of optical storage devices large libraries can be accommodated in less space and reasonable cost. It's difficult to update them frequently and also their storage space is very less.

3. WHAT IS DIGITAL LIBRARY EDUCATION?

Digital library education is a concept in which we use the digital library to aid education and lead to development and progress in the field of education. This

concept has been developed in the recent twenty years and is growing at a very fast pace. Many researchers have invested in developing the digital library so that we can use digital library in normal practice as it makes easier to get any information through the use of digital libraries. Let's take an example to prove what we said, we just need to click the search button and get the required information in a second but to do so when we only had books and handwritten data it was difficult and cumbersome and required a lot of time. In the life of a student libraries play a very important role as it helps the student to get more and more information for its studies and upgrade their knowledge and intellectual to a higher level. These libraries have same functions as traditional libraries but also we can have some extra functions due to its digital nature and a bigger network which is widespread.

Digital library plays some important role in the field of education and they are as follows:

1. They give a user friendly environment; it's a whole new experience for the students to learn in this manner through digital libraries.

2. It gives students the chance to publish their ideas and thoughts. Basically it gives the students an authoring space, a platform which would make their ideas available to a large mass and it would lead to their overall development and growth.

3. This basically is the data from which teachings are to be carried out in classes and is the basic course for the particular subject which has to be studied thoroughly by the students.
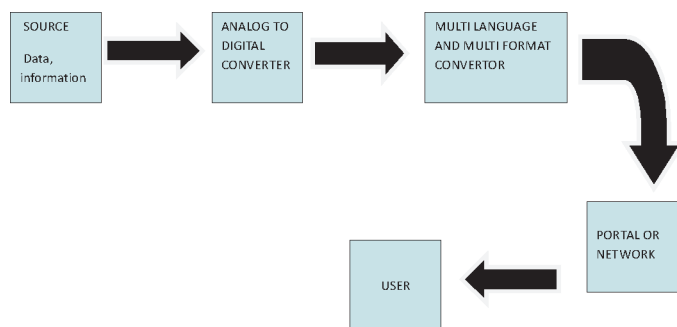
Figure 1. Flow chart representing digital library.

4. HOW IS THE DIGITAL LIBRARY EDUCATION AFFECTING STUDENTS

Digital libraries have basically affected students and prove to be of use for students in various ways as follows:

1. Digital libraries acts as references for the students as they give them knowledge of data beyond that of regular course. For students to do research and projects there is need to do a lot of study and reading of ample data on a particular topic and this could be made available through digital libraries

Table 1. Difference between traditional library and digital library

Traditional library	Digital library
Data is available in handwritten or printed form.	Data is available in all digital forms.
Users need to visit the library physically.	Can access the information from anywhere of the world.
Searching and browsing is simply based upon the locations of the same related materials. For egg- books on mathematics are present are near to one another in different section.	Searching is based on any particular keywords, related subjects, hyperlink etc.
A library can handle fewer databases.	Store very large databases in a limited space.
It consists of limited access points.	It can be operated by unlimited access points.
It occupies large space to accommodate more number of books and printed materials.	Contrary to traditional library it occupies small space. So it is possible to store all the books in the digital form.

as they hold much reference material through a wide network which is ready available.

2. These libraries provide data for higher education. There are many researches going all around the globe, the digital libraries can be updated regularly and it would be very helpful for students who need to do dissertations or project work as they make the knowledge readily available and widely accessible and researches of students can be easily published and get recognized all around the world.

3. Universities all around have their scholarly publication. It's easier if this is done by publishing it online as the printed form of journals are a bit costly as well as are not easily accessible by a large mass.

4. Authors may give open access to their studies. Data is available for people and they may copy it and utilize it by making any change. Many organizations are also there that deal with the intellectual rights of the data being made publically available so that some rights are reserved even if data can be accessed openly.

5. ADVANTAGES OF DIGITAL LIBRARY

1. The data that digital library contains is present on the internet. But people find it difficult to search their related topics and information as the data available on the web is large and all the information is scattered and intermingled. Extra

effort is needed to collect desired data. Contrary to this digital library proves to be a savior as it saves human effort. It is basically a set of focused and précised collection of selected data. So in this way digital libraries can be a better reliable source.

2. It allows the conservation and preservation of the original copy. A number of copies can be produced without degrading the original copy's quality.

3. Maintenance cost for digital library is much less than the orthodox library. In the normal libraries much money is spent on maintaining books, paying staffs etc. But digital library has no such limitations.

4. It provides a user friendly interface.

5. Digital libraries are integrated with each other means one digital library can provide the link to other resource of digital library. In this way the resource sharing can be easily done.

6. Another advantage is that it stores much more information in limited space in comparison to the traditional libraries.

6. DIGITAL LIBRARY'S ROLE IN DISTANCE EDUCATION

The importance of education has been known to us for years now, we aim at educating each and every individual around the globe .In recent years one of the best evolved feature in the field of education is distance learning which is affordable as well as easily accessible way of having education, as technology has evolved a lot. In distance learning programs we tend to give knowledge to the students by the videos sound clips data available in a digitized format. It won't be possible for the open universities to provide libraries in physical sense but it is possible to give them access to digital libraries through which they could get the same knowledge as to that of a physical library. This open distance learning program has made education just a finger away to the individuals, it's easier for students to study anywhere and everywhere there is no time boundation, place boundation and is very beneficial as a whole. In INDIA also, this concept of distance learning is being developed .The first distance learning program was offered by the Delhi University and now it's offered by many universities all around India.

7. DIGITAL LIBRARY INITIATIVES IN INDIA

Digitizing the libraries has now become a common practice. India is not behind in adopting this. From the mid 1990's onwards concept of digital libraries has been introduced due to globalization and widespread of information technology. Initiatives for development

of digital library were undertaken so as to preserve the culture and heritage of the society. Further in 1996, this concept was raised during the conference which was held at Bangalore organized by the Society of Information Science. Digital library education is still in developing phase in India.

8. DIGITAL LIBRARY IN INDIA (DLI)

The main goal of DLI is to secure ancient Indian culture and heritage which is contained in art, palm leaves, manuscripts, scriptures and books and to convert it into digital form so that it can be recognized by many people.

Till now the numbers of books scanned are more than 2, 89,000 which contain approximately 1, 70,000 are in Indian languages. On the DLI website Indian Institute of Science more than 84,000 books are available. Through a common accessible website link which is provided to other partners as well.

NATIONAL DIGITAL LIBRARY SYSTEM

STATISTICS OF DISTANCE LEARNING IN INDIA
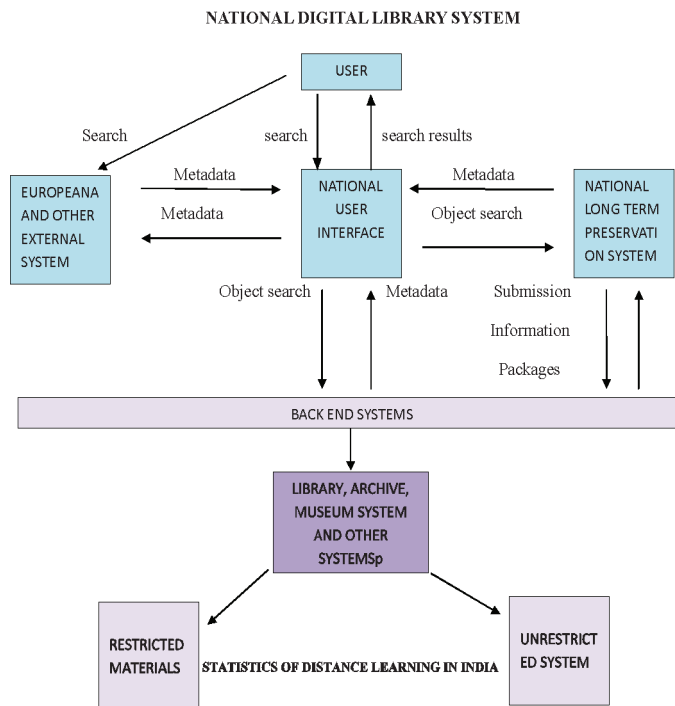
Year	Distance teaching institutions	Student enrollment
1962	1	1,112
1970-71	17	29,500
1980-81	34	1.6 lakh
1985-86	40	3.5 lakh
1990-91	51	5.9 lakh
1995-96	57	10.3 lakh
2000-01	79	13.7 lakh
2005-06	117	18.3 lakh
2009-10	200	36.6 lakh

9. DEVELOPMENT ISSSUES IN INDIA

1. Lacks of proper knowledge - Indian people are unaware of the latest technologies that can be used to build and maintain digital library faster and easily.
2. Lack of funding- World class library needs healthy support from management, concerned authorities in terms of funding, human resources which is unfortunately not appropriate in our country.
3. Lack of technical training- Human resources need to be updated with the new technologies and they require proper training with the help of which they would be able to cope up with the world.
4. Inflexibility in the policies of publishers and data formats- In digital library the data can be present in any format like PPT, RTF, PDF, and HTML. Most publishers publish their writings in their own e book reader format from which data extraction is very difficult. Also publisher's copyright permission is also needed to convert their data into required digital format.
5. Outdated libraries- In most of the libraries outdated softwares are still used. Also there is a lack of planning for the development of digitization. Number of well trained personnel to operate such libraries is also less.

10. SOLUTIONS TO ABOVE PROBLEMS

The problems discussed above surely affects the success of digital libraries. These problems need to be overcome in order to establish a well planned digital library. Following measures can be taken in this direction.

1. National policy for digitization should perform multipurpose tasks. It should focus on the education and learning of people and the preservation of cultural heritage.
2. More focus should be given on the advancement of basic infrastructural facilities. It can be internet connectivity, telecommunication etc.
3. It's important to create awareness among the users regarding the need of digital library and the usage of latest technology.
4. Proper training should be provided to people for smooth working of library.

11. WORLD SCENARIO

Digital libraries have spread rapidly form the 1990's. Several initiatives were taken which include large amount of funding by the U.S government in 1993 on digital libraries. Soon this new concept gained popularity. Various workshops and conferences regarding digital libraries were organized in different parts of the world. Journals, online journals, new print and magazines on digital libraries began to emerge. United States was keener to establish well planned library and it started 6 digital library research projects.

EUROPE

Europe is also not untouched with such concept. Measures are being undertaken in this way. These measures covered almost all types of subjects including latest digitization techniques, proper planning and training

Many projects have been initiated in Europe to enhance digital library education.

CANDLE (Controlled Access to Network Digital Libraries in Europe) - This project has members in the countries like Italy, Spain, the UK and Greece. It aims to produce low cost library software. It gives encouragement to publishers to give electronic products to libraries in order to meet the growing demands of people.

MIRACLE (Music Information Resources Assisted Computer Library Exchange) - It is coordinated by the Netherland's Dutch National Library for Blind (SVB). This project is a boon for blind musicians. They used for Braille language for reading musical scores. Earlier musical scores were available in the form of Braille and thus the whole production was labor intensive, time consuming, expensive, required good knowledge of music and encoding of this music. Four Braille music libraries came up with an idea to reduce costs and reduce human efforts. They formed MIRACLE which developed a system in which others libraries can download Braille music in the required digital form from the database.

RUSSIA:

In Russia a drastic development would be seen in the coming years. The Russian government has taken measures to promote digital library education in the country. Use of eBooks has slightly increased. A national network of digital library has been made so as to provide educational aid to higher and secondary educational systems in the country. In 2015 it will be made mandatory for the educational institutions to incorporate the use of eBooks. It's expected that the market of eBooks would reach us$16.12 million that would be almost double of what it was in 2012.

CHINA:

In China the digital library development began in the mid 1990s and several measures were taken so as to establish new national level digital libraries in the country. In 1997 the Chinese experimental digital library was launched and many other projects like The Knowledge Network-Digital Library Systems (1998), internationalization and interoperability study of the Chinese Library System were initiated.

12. CHALLENGES POSED TO DIGITAL LIBRARIES

There are many challenges which are faced by the digital library and these are as follows:

1. For data to be stored in digital library the data needs to be converted initially from the analog to digital format .For this we require devices that do these conversion in such a way that the data produced is of good quality and also the precious originals are not damaged in any manner.

2. While converting data we must keep in mind if all the contents need to be digitized according to the level of detail required and this would require much labor.

3. When the data is stored in digital library many users would come across it and many would give their suggestions or would like to enhance the matter but it would not be feasible if each and everybody gets the right to do so and it would also be difficult to know whether the suggestions are good or not.

4. It should be kept in mind while making the digital libraries that at what level it is made and how it has to be standardized, what protocols it needs to deal with and also how can it safeguard the rights of the authors and there is always a need of betterment as technology grows day by day and also our requirements are more and more.

5. One of the important prospects is legal concern which is appropriate recognition and protection of rights like the copyright, publicity, privacy and many more. Care should be taken while concerning these matters.

6. It must be possible for one to relate properly the digital data to the physical .There must not be in any discrepancy in both .Libraries may have both the digital and physical data and one may access the digital data and it must have all the data in appropriate manner

7. There is diversity in the contents what format they have we find heterogeneity in materials and to have all of them assemble in digital library they need to be similar and made a bit homogeneous and its one of the task that digital library developers face as they collect data from different sources

8. The main aim behind developing the digital library is that the data has to be made available to large mass but there are many perspectives that need to be kept in mind while trying to work out the aim of making it available. We need to see how and who can develop such networked system and what are the people who would be benefited by the digital libraries, what is language these people are used to with and many more stuffs.

9. In digital libraries the data is available in different versions and this is because of different user demand it must be possible to have different forms but it would be difficult for digital library developer to upload different versions of a single data and would be cumbersome as well.
   New technologies need to be developed for making this whole process a bit easier.

10. Cost is one of the important factors that have to be kept in mind nowadays countries have their own national digital library a government would always want a cost effective way in which the digital libraries could be set up.

13. SOLUTIONS

1. Digital library should have system in which the user would have an option to view data in whichever language and format it wants.

2. Technology needs to be enhanced so that this whole conversion into digitized format could be made easy, quick and cheap.

3. A separate system needs to be there which would take in account the legal stuff.

4. The policies regarding privacy copyright need to be made flexible.

5. A system should be developed in which the suggestions given must be checked and accordingly it must be decided that any change in data has to be made or not.

6. Updating the data regularly should be made mandatory.

14. CONCLUSIONS

In this study we have discussed how the digital libraries have affected our lives, what led to the evolution of digital library and how this concept turned out to be a boon in the field of education. It proves out to be a game changer in imparting knowledge .The government and private firms all over the globe are trying to expand the network of digital library so that information is within the reach of every individual. The use of digital library would not demolish the shear existence of traditional libraries but would just satisfy the ever-growing need of individuals. Its elementary cost of development would be high but its maintenance needs are low as compared to that of traditional libraries. The digital libraries have been a great aid to the remote users .This would also make the individuals familiar with the modern technology and has reduced the time consumption as well as the human labor, as the search results are made precise. This advanced technology has made the learning process very interactive. As a conclusion we need to develop the digital library education at the grass root level so that everyone is benefited by its usage.

निष्कर्ष

उपरोक्त अध्ययन में हम चर्चा करेगें कि कैसे डिजिटल पुस्तकालय हमारे जीवन को प्रभावित कर रहे हैं, किसने डिजिटल पुस्तकालय को उन्नत किया हैं और कैसे यह अवधारणा शिक्षा के क्षेत्र में एक वरदान हो गया हैं। यह ज्ञान प्रदान करने में महत्वपूर्ण हो गया हैं। दुनिया भर की सरकारें और निजी संस्थान डिजिटल पुस्तकालय के नेटवर्क को बढाने की कोषिष कर रही हैं जिसके फलस्वरूप सूचना हरेक व्यक्ति की पहुँच में आ सके। डिजिटल लाइब्रेरी का उपयोग पारंपरिक पुस्तकालयों की अस्तित्व को नहीं ध्वस्त करेगा और यह हमेषा लोगो की बढती हुई आवष्कताओं की भी पूर्ति करेगा। इसकी विकास की मूल लागत अधिक हैं परन्तु इसकी रखरखाव की जरूरत पारंपरिक पुस्तकालयों से कम हैं। डिजिटल पुस्तकालय ने दूरदराज के उपयोगकर्ताओं के लिए एक बड़ी मदद की है। इसनें उपभोक्ताओं को उन्नत प्रौद्योगिकी से परिचित बना दिया है और समय उपभोग और मानव श्रम को कम किया है और परिणामों को कीमती बनाया हैं। इस आधुनिक तकनीक ने सीखने की प्रक्रिया को बहुत संवादात्मक बना दिया हैं। एक निर्का के रूप में हम सभी को डिजिटल पुस्तकालय की शिक्षा को जमीनी स्तर पर विकसित करना होगा जिससे हर कोई इसके उपयोग से लाभान्वित हो सके।

REFERENCES

1. Catherine C. Marshall. Annotation: from paper books to the digital library. In Proceedings of the second ACM international conference on Digital Libraries, New York, USA, 1997. ISBN: 0-89791-868-1.

2. Chowdhury G & Chowdhury S. Introduction to digital libraries. Facet Publishing, 2002, ISBN: 1-85604-465-3.

3. Edward A. Fox & Gary Marchionini. Toward a worldwide digital library. Magazine Communications of the ACM, Volume 41 Issue 4, New York, USA, 1998. pp. 29-32.

4. Ian H. Witten, Stefan J. Boddie, David Bainbridge & Rodger J. McNab. Greenstone: a comprehensive open-source digital library software system. In Proceedings of the fifth ACM Conference on Digital Libraries, New York, USA, 2000. ISBN: 1-58113-231-X.

5. Michael Lesk. Understanding Digital Libraries. Elsevier, 2005. 456p.

6. Lucy A.Tedd & J.A. Large. Digital Libraries: Principles and Practice in a Global Environment, Walter de Gruyter, 2005. 280p.

7. Balakrishan N, Reddy Raj, Ganapathiraju Madhavi & Ambati Vamshi. Digital Library of India: A tested for Indian language research. TCDL bulletin 3, 2006, ISSN 1937-7266.

8. Birte Christensen- Dalsgaard. Research and Advanced Technology for Digital Libraries. In Proceedings of the 12th European Conference ECDL 2008, Aarhus, Denmark, 2008.461p.

9. http://www.dlib.org

कानूनी पुस्तकालयाध्यक्षता : पंजाब के कानून महाविद्यालय के पुस्तकालयों का मूल्यांकन
Legal Librarianship on Move : An Evaluation of Law College Libraries of Punjab

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सारांश

पिछले एक दशक से नयी कानूनी संस्थानों की स्थापना को देखा है। सूचना और संचार प्रौद्योगिकी के क्षेत्र में एक क्रांति के साथ ऐसे संस्थानों की मात्रात्मक वृद्धि ने लॉ महाविद्यालयों और लॉ विश्वविद्यालयों से जुड़े पुस्तकालयों की मूल अवधारणा को ही बदल दिया है। वर्तमान सर्वेक्षण पंजाब के लॉ महाविद्यालयों के पुस्तकालयों में उपलब्ध पारंपरिक और गैर पारंपरिक संसाधनों और सेवाओं का पता लगाने और मूल्यांकन करने का प्रयास किया है। 13 महाविद्यालयों के लिए एक प्रश्नावली वितरण के माध्यम से एकत्र आंकड़ों ने, उनके बुनियादी ढांचे, संग्रह, तकनीकी संसाधन, सेवा, वित्त, कार्मिक और सूचना प्रौद्योगिकी के उपयोग पर प्रकाश डाला गया है। डाटा को पंजाब विश्वविद्यालय, चंडीगढ़, पंजाबी विश्वविद्यालय, पटियाला और गुरुनानक देव विश्वविद्यालय, अमृतसर में 2008 तक स्थापित एवं संबद्ध 13 महाविद्यालयों तक सीमित रखा गया है।

ABSTRACT

Last decade has seen setting up of new law institutions. Quantitative increase of such institutions coupled with revolution in information and communication technology has changed the very concept of libraries attached to law colleges and universities. The present survey attempts to explore and evaluate the conventional and non conventional resources and services available in law college libraries of Punjab. Data Collected through distribution of a questionnaire to 13 colleges, highlights their infrastructure, collection, technical processing, services, finance, personnel and information technology usage. The data is limited to 13 colleges established till 2008 and affiliated to Panjab University, Chandigarh; Punjabi University, Patiala and Guru Nanak Dev University, Amritsar.

Keywords: Law colleges; libraries; BA, LLB; Punjab; legal education; law libraries

1. INTRODUCTION

Legal education is fundamental for the progress of a nation aiming at all round development of learners. Colleges being the first doorstep en route for higher education, libraries act as the hub of their academic activities. Among various types of colleges, the colleges of Law are centers grooming for future judges, lawyers, legal advisers and law teachers.

Punjab is one of the 28 states of India, located in its North-West. According to Statistical Abstract of Punjab (2012), in 2011, Punjab had 10 Universities, 238 Arts, Science, Commerce and Home Science Colleges, 84 Engineering, Technology and Architectural colleges,08 Medical Colleges, 185 Teacher Training Colleges (BEd/MEd), 3810 Senior Secondary schools (10+2 Pattern) and 4844 High Schools. If we consider the percentage of literates, Punjab has seventh rank amongst the states of India. In the beginning of 21st century, a number of law colleges/institutions have proliferated in Punjab. These institutions can be categorized into following five groups: which are given below:

1. Law University   01
2. University Colleges of Law   05
3. University Regional Centers   04
4. Law Colleges (LLB) & (BA, LLB)[13]

2. OBJECTIVES
The objectives of the study are:
- To understand physical facilities, collection and finance of the libraries.
- To take stock of services and personnel of the libraries
- To understand use and utility of computers in these libraries.

3. REVIEW OF LITERATURE
A number of studies have been conducted on different types of libraries. However, selective studies on library services confined to India are reviewed here.

Prasher[1] in his book titled 'Managing University libraries' evaluated the organization and working of the five libraries of agricultural universities of northern India. He studied the place of the library in the organizational set up of the university, objectives and functions of the libraries, internal organization, budget, staff, resources, building and readers' services.

Kaur[2] in her doctoral thesis titled 'Development and growth of university libraries and their services in Punjab' reviewed the relative growth and development of university libraries of Punjab since their inception with particular reference to personnel, finance, collection and service. The study was based on primary and secondary data. The primary data was collected with the use of a questionnaire and two interview schedules, one for the users and the other for the library staff. The sample was selected by using stratified quota sampling technique. The author concluded that there was a consistent and significant annual growth in the university and library expenditure. The study showed tremendous growth in all the four university libraries with regard to finances, library personnel and membership during the period of study. Further it highlighted that the users were satisfied with the library services. However a communication gap was observed between the library and users. The study emphasized on the need for greater role of the library committee, awards for efficient library staff, long term financial planning and collection development policy for the effective utilization of resources in the libraries.

Tadasad and TaliKothi[3] in their paper examined the awareness and utilization of resources and services of City Center Library, Gulbarga. The study was based on the survey of two hundred and twenty nine users. It was found that a majority of the users were aware of resources and services in the library. The study highlighted that majority of the respondents were satisfied regarding the resources, services and facilities provided in the library. Some users were unaware of non-book material and inter-library loan. The authors suggested regular awareness programs so as to increase the optimum utilization of the resources, services and facilities in the libraries.

Mishra and Satyanaryana[4] conducted a study on Tagor library of Lucknow University for uses of internet in a university library. The study was based on primary data collected through questionnaire method from a sample of fifty respondents. The main focus of the study was to assess the purpose of using internet and its impact on their working. The study concluded that internet was a useful tool for the library and information professionals for performing their duties.

Varma et.al[5] in their paper discussed the details of the organizational structure and communication pattern of the Agriculture College Library, Gawalior . The study revealed that structure of the college library was divided into three parts : sections of library, collection of the library and services of library. The communication facilities available in library were Intercom, Telephone, Telex, Fax, Satellite, E mail, Internet, Mobile, photocopy etc. The study suggested the improvement in the networking facility and full automation of the library for its efficiency.

Arjun and Kumar[6] in their research paper analysed the user's satisfaction level with the departmental libraries in Punjabi university Patiala. The study was based on primary data collected from a sample of 150 respondents taken from 23 departments having independent libraries in the university. The study found that the condition and arrangement of library materials in most of these libraries was good. The study recommended for more funds for the departmental libraries so as to improve their condition and user's satisfaction level.

4. SCOPE

The study is limited to all the colleges affiliated to Punjabi University, Patiala (PUP), Panjab University, Chandigarh (PUC) and Guru Nanak Dev University (GNDU), Amritsar offering five year courses in the subject of Law and approved by Bar Council of India (BCI). The present study has been restricted to institutions offering five year courses because after visiting many law libraries where three year law courses are offered, it has been observed that law college libraries where five year integrated courses are offered are far better equipped in terms of finances, services and use.

5. METHODOLOGY

A questionnaire as a tool was compiled and disributed among the select colleges by personally visiting their libraries so as to get the data instantly and with more precision. The data is presented, analyzed, interpreted and supplemented with tables for realizing the objectives.

6. FINDINGS

The results of the survey after on analysis of data collected are discussed below:

6.1 Infrastructure

It is revealed that all 13 libraries are housed in College buildings forming part of college premises. Three libraries are considering future expansion. Five libraries have separate reading rooms for users to study while in eight libraries seating arrangement is made within stacks area. According to Bar Council of India Inspection Manual (2010) library shall have adequate

reading space for at least 25% of enrolled students. These standards are not met by eight libraries.

6.2 Collection

Ten libraries have reported to adhere to book selection policy of the institution but none of them possess any written document thereof. It is found that teachers and principals of colleges play main role in book selection process. The book collection strength of the libraries is shown in Table 1.

Table 1. Book collection of libraries

Total number of books	No. of libraries
below 2000	Nil
2000-4000	08
4000-6000	03
6000-8000	Nil
8000-10000	02

It reveals that a majority of libraries (8) have a collection of 4000 volumes, Three Libraries have collection of 6000, while two libraries possess 10,000-volumes. No Library has less than 2,000 books. No colleges receive grants from both University Grants Commission (U.G.C) and State Govt. Textbooks comprise major portion of library collection. Three libraries have book banks to help poor and needy students. Majority of libraries are subscribing for legal databases like Manupatra and SCC online. Libraries have non-book material in inadequate quantity, mainly CD's that come free with books. There is only two libraries subscribing to foreign journals.

6.3 Book Purchase Committee' and Stock Verification

The colleges constitute a committee called 'Book Purchase Committee'. The respective Principal of the college is the Chairman of library committee in eight libraries whereas in two colleges lecturer heads the committee and in these two colleges chairman does not exist at all. In one college Management plays role of the chairman and it comprises Principal as convener and lecturers and librarian as members. Librarian acts as the member secretary of the committee in 08 libraries and these committees are advisory or executive in nature.11 libraries undertake stock verification on regular basis whereas one library undertakes stock verification once in two years and the remaining 01 library carries out the same every three years.

6.4 Technical Processing and Access

There are five libraries with a collection not arranged according to any classification scheme. Eight libraries possess either fully or partially classified collection. All the 08 libraries use D.D.C (22nd edition). The libraries catalogue their collection either fully or partially using either AACR-I or AACR-II. Four libraries follow open access system in stacks area, another four libraries undertake open access partially and five libraries have closed access to collection.

6.5 Services

All the libraries report provision of short-range reference service and two long-range reference services as well. The data shows that 05 libraries offer referral service. Majority of libraries are providing Current Awareness Service to users. Only 06 libraries have organized book exhibitions and two of these organize them on important events. Some libraries also invite booksellers to organize book exhibitions. The libraries provide orientation service to users. The working hours of almost all the libraries are in tune with the office hours of the institution as most of them are open for 6-8 hours during a working day.

6.6 Circulation and Usage

All the 13 libraries have a practice of lending books instantly on demand. Different Libraries issue different number of books to users which is shown in Table 2.

Table 2. Number of Books that can be borrowed

No. of books	No. of libraries
1 -3	9
4-6	2
7-10	2

Table 2 reveals that majority of libraries lend 3 or less books, whereas in 4 colleges number varies from 4 to 6 or 7-10 . Eight colleges' libraries put the demand boxes for students where students put slips giving details of required book or any other valuable suggestion.

On the other hand, in case of teachers 04 libraries lend any number of books to them. Four libraries lend 1-5 books to a teacher at a time, while 01 libraries issue 6-10. Two other libraries, issue 11-15 books at a time and other 2 lend 15 – 20 books to teachers at a time. Most of the libraries lend books to students for 14 or 15 days. Five libraries allow teachers to borrow books for unlimited period.

Table 3 furnishes data regarding average number of visitors to the library. It reveals that large number of libraries are visited by 41-80 users everyday whereas five libraries are visited by less than 40 users. One library is visited by more than 120 students on an average.

Table 3. Average number of visitors to library

Number of visitors	No. of libraries
0-40	05
41-80	07
81-120	Nil
More than 120	01

6.7 Finance

All the thirteen libraries have provision for annual budget of Rs. 50,000 to1 lac. It is disappointing that none of the libraries got any financial assistance from state Govt. /U.G.C for purchase of reading material during the period. It is found that every library spends 2-4 lac. in the initial years of college. The other sources of finance for these libraries are library fee, library development fund and amalgamated fund etc.

6.8 Personnel

It is found that 11 libraries have sanctioned post for librarians while two libraries have a post of assistant librarian . For instance library of Rayat & Bahra College of Law, Kharar under the aegis of Rayat and Bahara group of institutions is headed by an assistant librarian. Like wise library of Bathinda college of Law is managed by an assistant librarian. Rayat College of Law, Ropar has a post of regular teacher for library. Most of the libraries have not sanctioned posts of restorers while only 04 libraries have sanctioned post of Assistant Librarian. Similarly only 09 libraries have sanctioned posts for library attendants. Educational Qualification of librarians has a greater impact on the organizational health of libraries. The academic and professional qualification of librarians can be deciphered from the table below.

It is evident from the table (Table 4) that out of 13 librarians 07 possess Master's degree in Arts/ Science and Master degree in Library and Information Science, while another 01 librarian possesses Master's degree in Arts/Science and Bachelor degree in library information Science. Four librarians are having Bachelors degree in Arts or Science and Integrated Master's degree in

Table 4. Educational qualification of librarians

Qualification		No. of librarians
Academic	Professional	
M.A., M.Sc., Mphil	MLib & ISc	01
M.A., M.Sc.	MLib & ISc	07
M.A., M.Sc.	BLib & ISc	01
B.A., B.Sc.	MLib & ISc (integrated)	04

Library and Information Science. One librarian is M. Phil. in History alongwithMaster's degree in Library and Information Science.

6.9 Use of Computers

The study discloses that 07 libraries have computer facility where as one library has E- granthalaya. Two libraries are using Libsys. Three libraries are using Lib guru and and another two Libsoft. Six libraries do not make use of any software. However, out of these one library has compiled database of books and periodicals in `MS-Word'. One library has acquired computer system without putting it to any use . It is clear that libraries use computers primarily to perform housekeeping operations. Only eight libraries have Internet facility for users. Seven libraries have set up photocopying facility for students and teachers.

7. CONCLUSION

The analysis makes it clear that overall picture of these law college libraries is not satisfactory. Books are not properly housed, which poses problems for future expansion. Size of collection of different categories of college libraries is hampered by finances available for the purchase of reading material. In large number of libraries, reference collection is found to be very small which needs immediate attention. Libraries don't have a proper book selection policy to keep the things on right track. While interacting with librarians it was noted that many of them are unaware of the many innovative services used in libraries. This indicates the urgent need to update Personnel in professional skills. In some libraries, it is observed that staff is not sufficient, which has impact on the organization and services of these libraries. In many libraries, supporting staff is inadequate and the personnel serving at a lower hierarchy are less qualified and even in cases illiterate which is harming the quality of library services. While interacting with librarians a few disclosed that they are not given the status equivalent to teachers. Further, the norms and standards of Bar Council of India (BCI) for library staff are not followed and need to be revised to make these libraries more efficient and effective.

निष्कर्ष

विश्लेषण यह स्पष्ट करता है कि इन लॉ महाविद्यालय पुस्तकालयों की समग्र तस्वीर संतोषजनक नहीं है। किताबों को ठीक से नहीं रखा गया है जिससे भविष्य के विस्तार में समस्या पैदा हो सकती है। महाविद्यालय पुस्तकालयों की विभिन्न श्रेणियों के सग्रंह का आकार पठन सामग्री की खरीद के लिए उपलब्ध वित्त के द्वारा रुकावट पैदा कर रहा है। बहुत से पुस्तकालयों में संदर्भ संग्रहों की बहुत कमी पायी गयी है जिस पर तत्काल ध्यान देने की

जरूरत है। पुस्तकालय के पास चीजों को सही स्थान पर रखने के लिए एक उचित पुस्तक चयन नीति नहीं है। पुस्तकालयाध्यक्षों के साथ बातचीत के दौरान यह नोट किया गया कि उनमें से कई अध्यक्ष पुस्तकालयों में इस्तेमाल कई नवीन सेवाओं अंजान हैं। इससे यह प्रतीत होता है कि कर्मियों को व्यवसायिक कुशलता से अद्यतन करने की तत्काल आवश्यकता है। कुछ पुस्तकालयों में, यह देखा गया है कि पुस्तकालयों में स्टाफ पर्याप्त नहीं है जिससे इन पुस्तकालयों के संगठन और सेवाओं पर असर पड़ रहा है। कुछ पुस्तकालयों में, समर्थित स्टाफ अपर्याप्त है और पदानुक्रम में सेवारत कर्मचारी भी कम योग्य है यहां तक कि कुछ मामलों में अनपढ़ स्टाफ के कारण पुस्तकालय की गुणवत्ता भी प्रभावित हो रही है। पुस्तकालयध्यक्षों के साथ बातचीत के दौरान इस बात का खुलासा हुआ कि उन्हें शिक्षकों के बराबर का दर्जा नहीं दिया जाता है। इसके अलावा भारत की बार कांउसिलिंग बीसीआई के मानदंडों और मानको का भी पालन पुस्तकालय के कर्मचारियों द्वारा नहीं किया जाता है, इन पुस्तकालयों को और अधिक कुशल तथा प्रभावी बनाने के लिए संचोधन करने की आवश्यकता है।

REFERENCES

1. Prasher, P.G. Managing University libraries. Today & Tomorrow. New Delhi,1991.
2. Kaur, Trishanjit. Development and growth of university libraries and their services in Punjab, Punjabi University, Patiala, 1994. PhD Thesis.
3. Tadasad, P.G.; Talikoti, C. & Sharanabas appa. Awareness utilization of resources , services and facilities of city center library, Gulbarga, *ILA Bulletin*, 2000, **36**(3), 80-86.
4. Misra, Jyoti & Satyanaryana, N.R. Use of internet in a University Library : A case study. *ILA Bulletin*, 2001, **37**(4), 132–134.
5. Verma, sarit, Singhal Arti & Pavan agarwal, Organization structure and communication pattern of library of agriculture college, Gwalior(M.P) *ILA Bulletin,* 2008, **44** (1-2), 25-29.
6. Arjun & Kumar, Dinesh. Use of departmental libraries of Punjabi University Patiala: A Study *ILA Bulletin,* 2009.

BIBLIOGRAPHY

1. www.barcouncilofindia.org
2. Inspection Manual 2010, Bar Council of India http://www.barcouncilofindia.org/wp - content/uploads/2010/06/Inspection- Manual2010.pdf
3. http://www.barcouncilofindia.org/about/legal-education/education-rules-2008/

परिणामकारक प्रतिप्राप्ति के लिए सूचना का बौद्धिक संगठन
Intellectual Organisation of Information for Effective Retrieval

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सारांश

यह प्रपत्र सूचनाओं के बौद्धिक संगठन पर प्रकाश डालता है। यह बौद्धिक और गैर बौद्धिक गतिविधियों को पहचानते हुए एक कारगर सूचना तंत्र बहाली में मदद करेगा। ज्ञान और सूचनाओं के तेजी से बदलते संदर्भ में सूचनाओं का बहु वैकल्पिक और विश्वसनीय सूचनाओं का जाल बनाना जरूरी बन गया है। यह प्रपत्र प्रभावी सूचना तंत्र के घटक और मापदण्डों को चिन्हांकित करता है। यह सभी घटक संगणकीय व्यवस्था, सूचना तंत्र और उपभोक्ता के संदर्भ में हैं। सूचना तंत्र को और प्रभावी बनाने की दृष्टि से अनुसंधान हो रहे है। इसमें सूची, सार और निर्देशन इन द्विवितीयक साधनों का अहम महत्व हैं।

ABSTRACT

This paper focuses on Intellectual Organisation of Information (IOI). It identifies the intellectual and non-intellectual activities that help for an efficient information retrieval (IR) system. In the rapidly growing context of information and knowledge, the efforts to retrieve relevant information from a variety of information networks becomes absolutely essential. This paper highlights these aspects, indicating measures of retrieval efficiency. All these aspects are in the context of computerised systems, information networks and users' approach. Research efforts are continuously made to get the maximum efficiency of IR systems. The paper discusses mainly the concept of intellectual organisation of information, features of IOI for accessibility of information, why minimum intellectual efforts are required in derived indexing systems and maximum intellectual requirements for assigned indexing, IOI and indexing languages, IOI in user services, IOI and content analysis, IR systems changing environment, areas of current research in IR systems.

Keywords: Intellectual organisation of information, IR systems-information retrieval systems, computerisation, indexing

1. INTRODUCTION

Information and knowledge are basic inputs to human growth and socio-economic development. The organisation of thoughts and ideas by the generators of information involves intellectual organisation. Over the last centuries, information available in documentary form has grown in volume, variety and forms. To facilitate access to them, secondary tools and techniques are developed involving intellectual organisation of such information and knowledge. So intellectual aspects and fundamental aspects of organisation are important and its implications in information storage and retrieval systems is crucial. If the concept 'intellectual organisation of information' is examined from a broader perspective, i.e. almost from the generation to the final presentation of information, the efforts to organise thoughts and ideas of generators have always been an intellectual effort. At every successive stage, i.e.

providing secondary services in the form of storage and retrieval tools and techniques involved in them, have also been the intellectual efforts. For example, reference interviews with users to provide precise information sought, storage methods, search techniques, construction of depth schedules of classification, design and development of macro and micro thesauri, retrieval efficiency measures, evaluation of indexing systems and the final presentation of retrieval results – in fact every activity out of these, indeed, constitute intellectual efforts. With the advent of computers and communication technologies, the scope of searching a variety of databases through Internet and online databases have widened substantially, with several new approaches to information storage and retrieval.

When we talk of intellectual organisation of information (IOI), in our context, it refers to the intellectual methods by which the secondary communication can be

organised to provide access to primary communication. In the early 1960s, a series of seminars was organised by the Graduate School of Library Science, Rutgers University, New Jersey, USA, on the Intellectual Organisation of Information with reference to a few systems of classification, indexing systems, techniques and tools, and newly emerging thoughts and ideas at that time. Since then the concept of intellectual organisation of information refers largely in the context of design and development of techniques and tools of information storage and retrieval systems.

'After the advancement in science and technology, the information could be produced in the form of microfilms, audio-visual aids, magnetic tapes and CD-ROMs. Today the information technology has tremendous impact on libraries. The use of computers in libraries introduced the newer ways of acquisition, storage and retrieval of information .The application of library software started which caters to a full suite of modules for every aspect of library operations and enables to handle extremely large collection'[1].

2. CONCEPT OF INTELLECTUAL ORGANISATION OF INFORMATION

We noted that all efforts to organise information are intellectual. John Ziman, a well-known distinguished physicist, describes how 'information' turns into 'knowledge' [1969]. In the context of scientific research, he observes, 'The aim of science does understand not the accumulation of data and formulae. We need to bite into whole concepts, not swallow them piecemeal. The separate pieces of information in the separate primary papers need to be joined to another, fused with one another, welded into a coherent intellectual machine, which may be used as a whole, whether for material benefit or for further scientific exploration. The work of synthesis is quite important as the analytical process of discovery and experiment.' He mentions about three aspects of the organisation of knowledge viz., in the context of IR, intellectual organisation refers to the intellectual effort to organise the storage and retrieval of information and knowledge, serving users to access their required information precisely, accurately and with speed and ease. Human Intellect is the power or activity of thinking, learning, understanding, assimilating, acquiring and organising mental constructs and recording it for communication.

Indexing techniques and tools are designed to get as many relevant documents as could be obtained while searching for documents that carry the required information. This applies equally to all computerised IR systems.

The effort in indexing is aimed to get a precise set of documents in a search. The shadow part (Umbra) in the Fig. 1 is surrounded by the neighbourhood

semi dark part (Penumbra) and the penumbras are surrounded by unwanted parts (Aliens). So, when a user seeks to use the file of information, the person gets an APUPA pattern facility i.e., he/she gets the precise ones, then somewhat related ones to get a wider range of documents that may carry the required information and successfully avoids the rest that are irrelevant and hence unwanted. To achieve this, IOI plays a most crucial role.
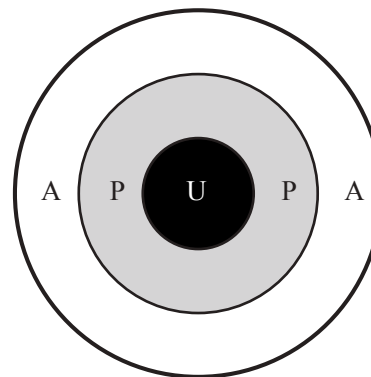
[A = Aliens; P = Penumbra; U = Umbra]

Figure 1. APUPA pattern

3. DEFINITION OF INTELLECTUAL ORGANISATION OF INFORMATION

The power or faculty of the intellect and the mind of thinking, learning, understanding, assimilating, acquiring and organising mental constructs and recording them in a suitable form for communication[2].

4. FEATURES OF IOI FOR ACCESSIBILITY OF INFORMATION

The sole purpose of intellectual organisation of information for secondary services, like bibliographies, indexes and abstracts, is to provide relevant information to users, within a time frame, with speed, accuracy and ease. To provide a facility for accessing primary information, secondary services are developed. It should be done in a manner that should provide ease of access, with speed and accuracy and should precisely meet the information requirements of users. Without this effort, accessibility to valuable information will be more or less lost.

5. MINIMUM INTELLECTUAL EFFORTS FOR DERIVED INDEXING SYSTEMS

'Derived indexing systems derive their information from the document (s) for indexing and are therefore highly amenable for computer organisation with least intellectual effort[3]'. KWIC, KWAC, Citation indexing are a few examples.

6. MAXIMUM INTELLECTUAL REQUIREMENTS FOR ASSIGNED INDEXING

Assigned indexing requires intellectual ability to assign keywords for the thought contents of documents in such a way that these selected terms could effectively represent the contents and make it possible to retrieve the precise information sought by a user. It also involves effective use of framing multi worded search statements, fixing the context. For this the indexer should have a good knowledge of syntactic and semantics of indexing. Assigned indexing require intellectual ability to assign keywords to the thought contents of documents in such a way that these selected terms could effectively represent the contents and make it possible to retrieve the precise information sought by a user. It also involves effective use of framing multi worded search statements, fixing the context. For this the indexer should have a good knowledge of syntactic and semantics of indexing languages. The routine operations of arranging the references in a suitable format and order and matching the search terms with the text of documents or surrogates according to inbuilt specific rules can be handled by computer easily.

7. IOI AND INDEXING LANGUAGES

Index languages are the tools that are used in indexing with syntactic and semantics features built into some of them.

Classification systems: such as Colon Classification (CC), Bibliographic Classification (BC), Dewey Decimal Classification (DDC) and Universal Decimal Classification (UDC), Library of Congress Classification (LCC) etc.

Subject Heading Lists[4]: Such as Library of Congress Subject Headings (LCSH), Sears List of Subject Headings (SLSH), Medical Subject Headings (MESH) and Subject Headings in Engineering (SHE) etc.

Thesauri: A book that lists[5] words in groups of synonyms and related concepts. The Engineering Joint Council (EJC) Thesaurus and the Thesaurus of Engineering and Scientific Terms (TEST) are among the thesauri used for scientific and engineering subjects. In the social sciences, the Educational Resources Information Centre (ERIC) thesaurus is extensively used.

Thesaurofacets: Thesaurofacets combines the features of analytico-sysnthetic classification and information retrieval thesaurus. Each of these can be used independently. The best examples are the 'Thesaurofacet of the English Electric Company' and the 'Root Thesaurus' of the British Standards Institution.

Natural Indexing languages: Natural Indexing languages are not really a distinct or stable language in their own right, but are rather the natural or ordinary language of the document being indexed. Here all terms are taken from the document itself.

Free Indexing Language: A free indexing language cannot be listed. Indexing is free in the sense that there are no constraints on the terms that can be used in the indexing process. Free indexing is different from natural language indexing In that the latter is constrained by the language of the document being indexed, whereas the former is not, i.e. the appropriate terms according to necessity may be assigned.

8. IOI IN USER SERVICES

The primary purpose of all this intellectual organisation of information and knowledge is to serve the various categories of users effectively to satisfy them in their information needs. But the effectiveness of user services depends upon our understanding of users and their information needs.

Information seekers are often in a state of uncertainty or lack of clarity in their conception of their information requirements. Their expression of needs is most often not precise and they need some intellectual support in the form of some hints or cues. To prepare an effective set of cues, it is necessary to analyse their behaviour and style of searching, even if they do their searches themselves or seek the help of information officers. Interaction with users to ascertain correctly their information needs would necessitate formal or informal meetings with them.

9. IOI AND CONTENT ANALYSIS

Content analysis is the effect of analysing the record of human experience and knowledge; it is a means of studying all types of communication, its nature, its underlying meanings, its dynamic processes, and the people engaged in the act of communication. The purpose of content analysis varies depending upon the activity to which this technique is applied. It is used as a research technique in social sciences, in psychology for counselling and diagnostic studies in psychiatrics. In library and information science, content analysis is used for a number of activities such as indexing and abstracting, classification of user studies, and in the production of a number of information products and user services. It can be used for varieties of purposes, for example, in the analysis of voting pattern in elections. Analytical newspaper reports, studies by institutions who specialise in election predictions, election manifestoes and other types of analysis are often made by experts in the fields available in the form of published documents, government reports, academic publications, etc. The analysis of all these, will give a comprehensive view

of the different shades of opinion and facts, which will lead to a new set of interpretations and implications. Content analysis forms the basis of such studies.

10. INFORMATION RETRIEVAL SYSTEMS IN CHANGING ENVIRONMENT

Information retrieval is the activity of obtaining information resources relevant to an information need from a collection of information resources[6]. Searches can be based on metadata or on full-text (or other content-based) indexing.

The three features of current information retrieval systems that are very conspicuously distinct are given below:

1. IR systems are increasingly computerised, although printed indexes and card catalogues in libraries still exist. But these are also switching over to computerised systems and will get fully automated in the near future.

2. Computer databases have grown phenomenally and are in all conceivable areas. Global databases/networks in academic disciplines that include all education and research materials in almost every specialised areas, business and industry, government resources, current affairs, finance, legal matters are all burgeoning rapidly. These are accessible through Internet and on-line services through commercial information service vendors. Full texts of documents, document surrogates like indexes, abstracts, and a host of bibliographic and other forms of information are accessible to users. Digital representations of information and Multimedia technologies have given further versatility to IR systems.

3. Users also have grown with a large number of them making direct access to these databases in a variety of subjects. These users are domain experts (with or without any knowledge of using computerised databases), laypersons and information intermediaries (who have gone through systematic professional training and experience).

The key issue is that any retrieval process is very much dependent upon the indexing and storage stages. In fact these two intellectual activities determine the search strategy to a large extent to obtain optimum results. However, the nature of computerised indexes varies greatly and searchers will get successful results if they recognise some of their inherent strengths and limitations. Generally speaking however, there a number of features those are common to all information retrieval systems, including CD-ROM based systems, the Internet, Online search services, Document management systems, and OPACs. There is a trend in using all these information networks or media by all kinds of users that include novices, domain experts who constantly use IR systems and are familiar with their facilities and functions, occasional users who may depend upon information intermediaries, and other type users who have special needs. Information managers and intermediaries, who do searches on behalf of all categories of users, are expected to be expert users of IR systems. They must work with the users, understand their specific needs and do the search in collaboration with users, reviewing the results of retrieval at every search stage to get maximum results.

11. AREAS OF CURRENT RESEARCH IN INFORMATION RETRIEVAL SYSTEMS

Active research efforts are pursued to refine or develop efficient information retrieval systems all over the world. The primary purpose of all these efforts is to get the best results for users. System developers and suppliers are striving to offer a best software package or a service. The information researcher is also equally concerned to develop the best retrieval system. The directions, these research activities are taking, may be summed up as given below:

11.1 Better Systems Design

This is primarily to improve methods of matching document descriptors with query descriptors. New methods of searching, other than Boolean search logic has been a major area of further research. Optimum retrieval efficiency, providing a reasonable proportion of relevant hits, and reducing overload of irrelevant hits is another line of research. Speed of retrieval is also implied in this type of research efforts.

11.2 Improved Retrieval Facilities and Strategies

Here an attempt is made to improve the efficiency and effectiveness of the system, including the characteristics of the storage requirements, the retrieval speed and the effectiveness of the system. Work in this area seeks to overcome the limitations of inverted file (a term entry system as against an item entry system) by developing fast methods of scanning the contents of database. This involves improving the speed of searching by a set of text scanning algorithms; alternatively to seek hardware-based solutions, most of which are related to speed of text-scanning.

11.3 Human-Computer Interface

This is another area of intense research. User-friendly approach is focused on development of self-explanatory, intermediary computer systems that would stimulate best-match searching, using knowledge-based techniques taking clue from artificial intelligence. 'The Art of Human-Computer Interface Design is an extraordinary work in the field of human-computer interaction'[7].

12. CONCLUSION

The sole purpose of intellectual organisation of information of secondary services, like bibliographies, indexes and abstracts, is to provide relevant information to users, within a time frame, with speed, accuracy and ease. In this process if observation occurred, data or ideas can be formulised and instrumental extra-senses can be done. If organisation or logical relation occurred, information can be formulised and systematic principles can be made. If conference and compaction this mental process occurred, subject can be formulised and fundamental principles can be made. If learning assimilation occurred, knowledge can be formulised and perception, modelling, process can be done. If judgement correlation application to contexts occurred, wisdom can be formulised and sensing the context retrieval of knowledge, appropriate decision can be done. In the age of ICT it's really difficult to retrieve appropriate information from the vast information and here IOI plays an important role and secondary tools can be applied. Whenever you create a subject surrogate, intellectual organisation plays a crucial role.

निष्कर्ष

सूचनाओं के बौद्धिक संगठन का उद्देश्य दूसरे स्तर की सेवाओं से संबंधित है। जिसमें संदर्भ सूची, निर्देशन और सारांश इन सूचनाओं को निर्धारित समय सीमा में, गति, सटीकता और आसानी से उपभोक्ता को प्रदान करना है। इस प्रक्रिया में देखा गया है कि थोडे और प्रयासों से जानकारी और कल्पनाओं को औपचारिक नया रूप दिया जा सकता है। अगर इसमें सैद्धांतिक या संघटन का पहलू नजर आता है, तो सूचनाओं के औपचारिक तत्वों की स्थापना की जा सकती है। अगर मानसिक प्रक्रिया में विचार विमर्श और संघटन प्रक्रिया होती है तो विषय सरलीकरण एवं उसके मूलभूत सिध्दांतों की स्थापना की जा सकती है। अगर अधिगम में आत्मीकरण होता है तो ज्ञान को औपचारिक बनाने तथा धारणा और प्रतिरूपण की प्रक्रिया होती है। अगर निर्णय प्रक्रिया में ज्ञान का उपयोजन दिखाई देता है तो ज्ञान को एक संवेदनशील ज्ञान में पुनःस्थापित किया जा सकता है। इस सूचना संप्रेषण प्राद्योगिकी के युग में सूचनाओं के ढेर से योग्य सूचना प्राप्त करना मुश्किल कार्य है। इस दृष्टि से सूचनाओं का बौद्धिक संगठन द्वितीय साधन के रूप में महत्वपूर्ण भूमिका निभा सकता है। जब भी किसी विषय का प्रतिनिधित्व करते हैं तो बौद्धिक संगठन महत्वपूर्ण भूमिका निभाता है।

REFERENCES

1. Oak, M. A Study of Select libraries of management institutes in india with special reference to institutions within the jurisdiction of university of pune with relevance to networking, accessibility and services to the users. Pune: University of Pune, 2010.

2. Ghosh, S. B. Intellectual organisation of information and information processing and retrieval. Indira Gandhi National Open University, New Delhi, 2010.

3. Horland, B. Assigned versus derived indexing. Retrieved from www.iva.dk/bh/lifeboat_ko. Available at http://www.iva.dk/bh/lifeboat_ko/CONCEPTS/assigned_versus_derived.htm. (Accessed on 16 May 2014).

4. EBSCO. EBSCOhost. Retrieved from EBSCOhost Research Databases: Available at http://www.ebscohost.com/public/sears-list-of-subject-headings. Last accessed 25 Sep 2014.

5. Farlex. thefreedictionary. Retrieved from the free dictionary by farlex. Available at http://www.thefreedictionary.com/thesauri. (Accessed on 25 Sep 2014).

6. Wikipaedia. Information retrieval. Retrieved from Wikipedia The Free Encyclopaedia. Available at http://en.wikipedia.org/wiki/Information_retrieval. (accessed on 18 May 2014).

7. Laurel, B. The art of human-computer interface design. Retrieved from amazone.com. Available at http://www.amazon.com/The-Art-Human-Computer-Interface-Design/dp/0201517973. (Accessed on 19 May 2014).

अनुसंधान एवं विकास संगठनों में डिजिटल सामग्री प्रबंधन के लिए ग्रीनस्टोन के साथ प्रयोग
Use of Greenstone for Digital Content Management in Reasearch & Development Organizations

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सारांश

यह लेख रक्षा वैज्ञानिक सूचना तथा प्रलेखन केन्द्र डेसीडॉक, दिल्ली में विभिन्न प्रकाशनों, अनुवाद और समाचार पत्र कतरन सेवा के डिजिटल पुस्तकालय का निर्माण करने में प्रोटोटाइप बनाने के लिए ग्रीनस्टोन के साथ किये गये कार्य पर आधारित है, देखें 2.86। इस लेख में ग्रीनस्टोन की मुख्य विशेषताओं पर प्रकाश डाला गया है जिनकी खोज अंत उपयोगकर्ता की आवश्यकता को ध्यान में रखते हुए उपर उल्लेखित ज्ञान साधनों की डिजिटल पुस्तकालय के प्रोटोटाइप को बनाने के लिए की गयी है। लेख में दुनिया भर के विभिन्न संगठनों को सूचिबद्ध किया गया है जो ग्रीनस्टोन के पूर्व संस्करणों का उपयोग कर डिजिटल पुस्तकालय बनाने में लगे हुए हैं। लेख के उत्तरार्द्ध हिस्से में सॉफ्टवेयर की विशेषताओं के बारे में विस्तार से बताया गया है कि किस प्रकार एक व्यक्ति एक संगठनात्मक जरूरत की आवश्यकताओं के अनुसार इसे अनुकूलित कर सकता है। अंत में, नवीनतम संस्करण का उपयोग करते हुए मौजूदा पुराने डिजिटल पुस्तकालयों को उन्नयन करने के लिए चरणों को विस्तार से समझाया गया है।

ABSTRACT

This paper is based on the work done with Greenstone Ver. 2.86 at Defence Scientific Information and Documentation Centre (DESIDOC), Delhi to create a prototype to build up the digital library of various publications, translations and news paper clipping service. The paper highlights the salient features of Greenstone which are explored to create the prototype of digital library of above mentioned knowledge resources keeping in view the end user requirements. The paper also enlists various organizations worldwide which are engaged in creating the digital libraries using earlier versions of Greenstone. The later part of the paper discuss in detail about the software features it provides and how one can customize it as per the requirements of the organisational needs. At the end, the steps for upgrading the existing old digital library into new using latest version are explained in detail.

Keywords: Greenstone, digital library, open-source software

1. INTRODUCTION

A digital content can be defined as the data objects like text, video, audio, images, etc., which are stored in digital form and can be accessed via electronic media like computers. This includes the born digital and the digitized data objects. With the help of computer networks we can remotely access the digital content stored locally. Digital Content Management deals with storing and accessing the data in a systematic manner.

Now-a-days a good number of software are available to design and develop the digital libraries as per need. A digital library is not only an effective tool to archive, maintain, and preserve the digital content for long term future use but also able to reach to the remote user with a click of mouse. With the help of digital library software, data processing becomes very easy and records can be organized and presented in an easy to access and with a beautiful outlook.

2. ABOUT GREENSTONE

Greenstone, which is an open-source software and is used for building digital library collections and distributing it on the internet or CD-ROM, is a multilingual software. It is a product of the New Zealand Digital Library Project which was produced at the University of Waikato. New Zealand Digital Library Project collaborated with UNESCO and the Human Info NGO in Antwerp, Belgium for the development and distribution of this software.

Its aim is to empower the users especially in the organizations related to education, science and culture

throughout the world, where there is a need to build their own digital library collections. With this UNESCO expect that the deployment of digital libraries will increase in the appropriate fields/sectors.

Greenstone was established as an international cooperative effort in August 2000 among above three parties, i.e., New Zealand Digital Library Project at the University of Waikato, United Nations Educational, Scientific and Cultural Organization and The Human Info NGO, based in Antwerp, Belgium[1]. Over a period of 14 years, extensive work was done to enhance and upgrade the features of basic version of Greenstone version 2.12 which resulted in the latest version, i.e., Greenstone 2.86.

3. SALIENT FEATURES OF GREENSTONE VER. 2.86

3.1 Accessibility
- We can access Greenstone through any web browser.
- The Greenstone Server can run on any platform (Windows, UNIX and Mac OS).
- We can publish its collections on CD-ROM/DVD.

3.2 Searching/browsing
- It provides both full-text and fielded search.
- Flexible browsing facilities are another advantage of the software.
- Metadata-based (Dublin Core) search can be done.
- We can search on the basis of collection.
- It supports hierarchical phrase browsing.
- It automatically creates all access structures.

3.3 Extensibility
- Greenstone provides a number of plug-ins for different types of software and metadata formats. For eg. word plug-in for word documents, text plug-in for plain text, RTF plug-in for rich text, PDF plug-in for portable documents, Powerpoint plug-in for power point documents, Imageplug-in for images, MP3 plug-in for mp3 documents, ZIP plug-in for compressed/archived documents and many more.
- With Greenstone we can classify new metadata browsers.

3.4 Multilingual Support
- It provides interface in different languages such as Deutsch, Chinese, Arabic, Maori, Russian, etc.
- We can create the collection for multimedia: video, audio.

4. WORLDWIDE DIGITAL LIBRARIES CREATED USING GREENSTONE

This software is now used internationally as it fulfills the user requirements and is multilingual.

Greenstone is used in different organizations for different purposes. It is used by many organizations worldwide to manage digital content and create digital libraries of various resources. Some of the examples are given below.

4.1 For Digital Library
- Oxford Digital Library
- AHKRC Digital Library, Islamabad, Pakistan
- Indian Institute of Management, Kozhikode

4.2 Music Library
- Afghanistan Centre at Kabul University – ACKU
- Agatange Collection
- Armenian Rare Books
- Auburn University Libraries Digital Library
- Digital Namibian Archive
- Music Information Retrieval Research
- State Library of Tasmania Sheet Music Collection

4.3 Research Papers/Newspapers/Journals
- Afghanistan Research and Evaluation Unit – AREU
- iArchives
- Illinois Wesleyan University, Argus Digital Collection
- Indian Institute of Science, Publications Database
- Papers Past
- Washington Research Library Consortium Special Collections

4.4 Hospital Archives/History/Human Rights
- Allen Park Veterans Administration Hospital Archives
- The Cushing/Whitney Medical Digital Library
- Local History Online
- Human Rights in Argentina

5. WORKING WITH GREENSTONE

Defence Scientific Information and Documentation Centre (DESIDOC) has taken an initiative to design and create the digital library of its valuable information resources available in the form of publications (like Defence Science Journal, DESIDOC Journal of Library and Information Technology), translations and newspaper clipping service using earlier version of Greenstone, i.e., Greenstone. Under the present project, salient features of Greenstone version 2.86 were explored to design and develop the digital library prototype of various information resources available in DESIDOC and make it accessible across the DRDO labs through DRDO Intranet.

5.1 Customization

We can easily mould Greenstone as per our requirement. For changing its layout we have to play with its code a little bit and for that we have to do changes in the following folders:

a) Web

i. CSS (Cascading Style Sheet)

We can add the new CSS code in the style.css file and the path for this file is Greenstone\web\ style.

ii. Images

The new images you use in your application should be added to the Greenstone\web\images folder.

b) Macros

The following dm files in Greenstone\macros are to be changed for the following reasons:

i. Style.dm: The header and footer should be added to this file to reflect the changes you want in your application.

ii. Query.dm: The header should be added to this file to have header on search page in your application.

iii. Document.dm: The footer should be added to this file to have footer on the following pages title, author, language, and keywords in your application.

iv. Pref.dm: The header should be added to this file to have header on preference page in your application.

v. Home.dm: You can even change the first page of your application by making changes in this file.

c) Collect

Changes in this folder are to be done while upgrading its version.

d) Ext

Here plug-ins are installed by unzipping the zip file of the software and placing it into the Greenstone\ext folder.

5.2 Upgrading its Version with Existing Collection

Step1: Installation of new version

The first step for upgrading is to install the latest version of the Greenstone.

Step2: Build Collection

Changes for building collection are as follows:

i. Go to Start → All Programs → Greenstone → Librarian Interface (GLI)

Window will be opened up as shown in Fig. 1.

ii. Now create a new collection with the same name you was using earlier for eg. Let it be translate.

iii. Now copy the data of old translat folder to the new folder in Greenstone\collect\translat., as shown
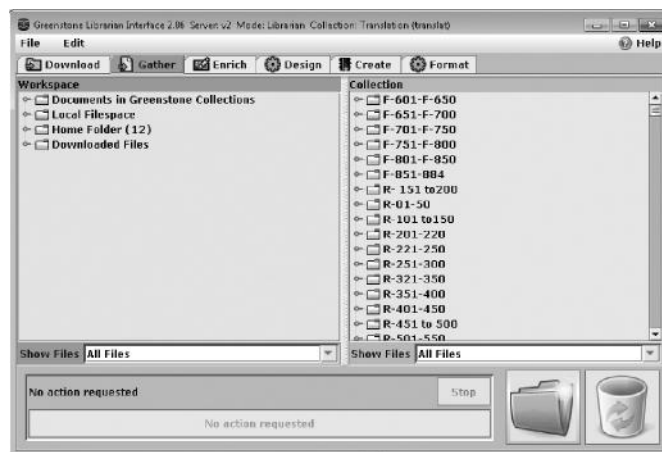
Figure 1. Greenstone Librarian Interface.

in Fig.2 and Fig. 3

iv. Download the PDFBox extension from http://svn.greenstone.org/main/tags/2.86/gs2-extensions/ pdf-box/trunk/pdf-box-java.zip and install it by unzipping it into Greenstone\ext folder.

v. Now again Go to Start → All Programs → Greenstone → Librarian Interface (GLI) and go to DESIGN tab and select pdf plugin and then configure it.as shown in Fig.4
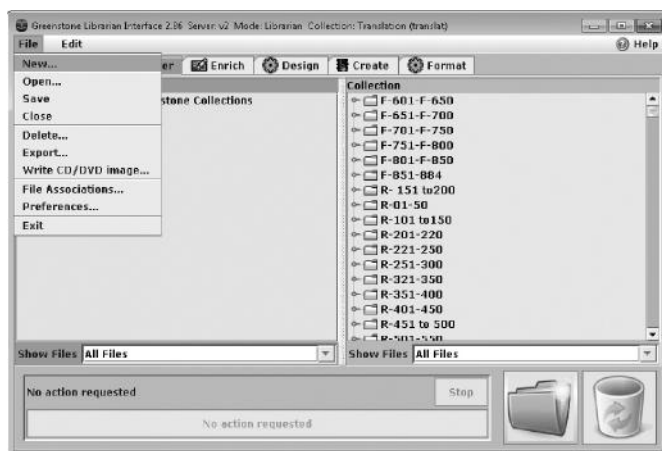
Figure 2. Create new collection.

Figure 3. Give name to new collection.
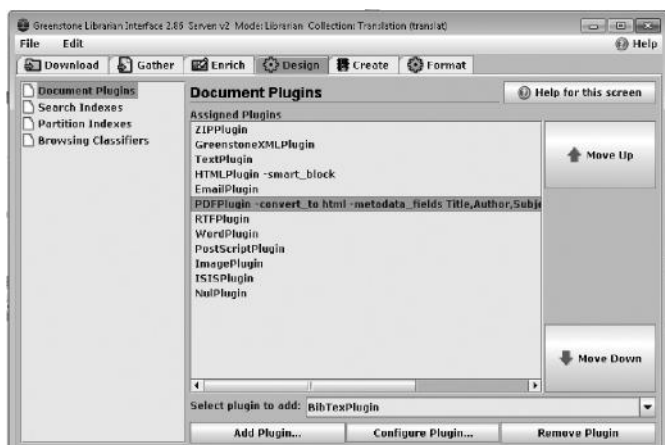
Figure 4. Pdf plugin configuration in design tab.

Figure 6. Building collection.

content in an R&D environment. It is widely used by different nations for creating digital libraries of different kind and collections for various purposes as it is open source and multilingual. The software can be easily downloaded, learned and customized as per individual organizational needs. Over the period of more than one decade it is embedded with extensive capabilities and enhanced features. The latest version proved as an excellent solution to develop digital library of vital information resources and services of an organization in an open source environment.

निष्कर्ष

हमारे अनुभव के अनुसार इस परियोजना के दौरान हमने पाया कि एक अनुसंधान एवं विकास के वातावरण में ग्रीनस्टोन डिजिटल सामग्री बनाने और वितरित करने के लिए बहुत अच्छे खुले स्रोत वाले साफ्टवेयरों में से एक है। ये विभिन्न देशों में विभिन्न प्रयोजनो के लिए अलग अलग तरह के डिजिटल पुस्तकालयों को बनाने और संग्रह करने के लिए व्यापकरूप से इस्तेमाल किया जा रहे हैं चूंकि ये खुले स्रोत है और बहुभाषी के रूप में है। सॉफ्टवेयर को आसानी से डाउनलोड किया जा सकता है, सीखा जा सकता है और व्यक्तिगत संगठात्मक आवश्यकतानुसार इसे अनुकूलित किया जा सकता है। इसे एक दशक से भी ज्यादा की अवधि में अधिक क्षमताओं और बढ़ी हुयी सुविधाओं के साथ सन्नहित 'embedded' किया गया है। एक खुले स्रोत वातावरण में महत्त्वपूर्ण जानकारी संसाधनों और एक संगठन की सेवाओं की डिजिटल लाइब्रेरी को विकसित करने के लिए नवीनतम संस्करण एक उत्कृष्ट समाधान की तरह साबित हुये हैं।

Figure 5. Adding metadata.

vi. Select metadata_field and pdfbox_conversion.as shown below in Fig.5.

vii. Now go to CREATE tab and select build collection option as demonstrated in Fig. 6.

This process will take time according to the size of database to build the collection and after that we can access the service.

6. CONCLUSION

As per our experience during this project, we found that Greenstone is one of the very good open source software suited to create and distribute digital

REFERENCES
1. http://www.greenstone.org
2. http://wiki.greenstone.org/doku.php?id=en:user:document_types

सोनूभाऊ बसवंत महाविद्यालय पुस्तकालय का स्वचलित अनुक्रमिक नियंत्रण प्रणाली : एक केस अध्ययन

Automated Serial Control System of Sonubhau Baswant College Library : A Case Study

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सारांश

इस लेख में सोनूभाऊ बसवंत महविद्यालय पुस्तकालय की स्वयंचलित नियतकालीक (पत्रिकाएं) नियंत्रण प्रणाली के बारे में परिचर्चा की गयी है। शोधकर्ता ने पाया की पुस्तकालय मे स्वयंचलित नियतकालीक (पत्रिकाएं) नियंत्रण प्रणाली के सभी कार्यों को सावधानी और व्यवस्थित ढंग से किया जाता है। शोधकर्ता को पुस्तकालय में 81 प्रिंट पत्रिकांए मील गयी। अधिकतम पत्रिकाओं में 44 मासिक और न्यूनतम पत्रिकाओं में 3 छह माही आवृतिबार पायी गयी है। इस शोध में मराठी भाषा में प्रकाशित होनेवाली 36 पत्रिकाएं, हिन्दी भाषा में 24 और 21 पत्रिकाएं अंग्रेजी भाषा से पायी गयी। सामान्य अध्ययन की अधिकतम पत्रिकाएं 22 और केवल 2 पत्रिकाएं इतिहास विषय से जुडी है। 36 पत्रिकाएं राज्यस्तरिय प्रकाशकों से है, 44 पत्रिकाएं राष्ट्रीय स्तर के प्रकशकों से है और केवल एक पत्रिका अंतर्राष्ट्रीय प्रकाशक से इस शोध में पायी गयी है। यह संषोधन लेख उपयोगकर्ताओं के अनुरोध एवं सुझाव, सदस्यता, आदेश, रद्द आदेश, भुगतान प्रक्रिया, वापसी भुगतान प्रक्रिया, आवृति बार, चेक–इन, आदी जैसी पत्रिका नियंत्रण स्वचालन प्रणाली प्रक्रिया जैसी गतिविधियों के बारे में बताता है जो इनफिलबनेट, गांधीनगर द्वारा सन 2000 में डिझाइन और विकसित एसओयूएल SOUL पुस्तकालय सॉफ्टवेअर द्वारा की गयी है। एसओयूएल SOUL 2.0 एकीकृत पुस्तकालय प्रबंधन सॉफ्टवेअर MS-SQL और My-SQL, MARC 21 प्रारुप आदी का उपयोग इलैक्ट्रॉनिक निगरानी और नियंत्रण के लिए करता है। इस सॉफ्टवेअर में निम्नलिखित मोड्यूल पाये जाते हैः प्रशासन, अधिग्रहण, सूची, परिसंचरण, पत्रिका नियंत्रण और ओपेक OPAC-।

ABSTRACT

Automation of serial control system of Sonubhau Baswant College Library is discussed in this paper. Researcher found that, in the library as per serial control management system step by step all work is done carefully and systematically. Researcher found that 81 print serials in the library. Maximum serials are monthly (44) and minimum serials are Biannual (3) frequency wise found. Maximum (36) serials are from Marathi Language, Hindi language (24) and English language (21) wise found in the study. Maximum serials from General subject (22) and only two journals are from History Subject. 36 serials are from State level publishers, (44) serials are from National publishers and only one Serial from International publisher is found in this study. This paper deals with the process of serial control system automation such as: request or suggestions from users, subscriptions, orders, cancel orders, payment process, refund payment process, frequency wise check-in, etc. activities are done in SOUL library Software developed and designed by INFLIBNET, Gandhinagar, in 2000. SOUL 2.0 integrated library management software uses MS-SQL and My-SQL, MARC 21 format, etc. for electronic surveillance and control. In this software following modules are found: Administration, Acquisition, Catalogue, Circulation, Serial Control and OPAC.

Keywords: Serial control, library, SOUL 2.0, bibliographic dormat

1. INTRODUCTION

The importance and need of serials as a transmission of new knowledge has increased after World War II. A serial offers new knowledge to researcher's base for their research work. Serials differ from any other publications such as books, report, etc. In the serial research articles are published. Articles are more recent than in books on a particular subject in any changing situation. A periodicals or serials may be broadly defined as, "a publication in a continuous series or in a numbers. It may be published in several parts."

AACR2[1] defines term 'serial' in the following word, "A serial appearing or intended to appear indefinitely at regular or stated intervals, generally

more frequently than annually, each issue of which normally contains separate articles, stories, or other writings". This definition best describes 'magazines', perhaps the most commonly known type of periodical because they are published for the general public. But not all periodicals are true magazines, most of them at least looking like magazines; they may have a similar format consisting of a cover followed by editorial or contents pages, and lacking a title page.

Serials are published in following frequency: daily, weekly, fortnightly, and monthly, bimonthly, quarterly, half yearly, yearly and also non regular serials. Therefore automated serial control is very useful to maintain all the records of each and every issue, volume wise serials in the library.

2. ABOUT SONUBHAU BASWANT COLLEGE LIBRARY

Sonubhau Baswant College of Arts & Commerce College has established in the year 1984[2]. College is situated in Tribal area of Shahapur, Dist. Thane. The institute has central and departmental libraries. The central library procured 234 books at the beginning of the college. Presently the library has more than 33000 books in general, more than 4700 books under the Book Bank Scheme, 414 Bound Volume of Journals, 81 periodicals, 51 Maps, 205 CDs and DVDs etc. Library has also subscribed N-LIST Online Journals consortia. Following programs are run by college: B.A (Five optional subjects), M.A. (Five optional subjects), B. Com., B.Com. in Banking and Insurance, B.Sc. in Information Technology. College has procured SOUL 1.0 library automation software in January 2004 and upgraded the same by SOUL 2.0 version in July 2009. Now the central library fully automated with the help of SOUL 2.0 software.

3. ABOUT SOUL 2.0 LIBRARY SOFTWARE

Based on the need and requirement of academic libraries, public libraries and other types of libraries Software for University Libraries (SOUL) is designed and developed by the INFLIBNET Centre. It is user-friendly software developed to work under client-server environment. The software is in compliance with international standards for bibliographic formats, networking and circulation protocols. After a comprehensive study, discussions and deliberations with the senior professionals of the country, the software has been designed to automate all internal operations in library. The first version of software i.e. SOUL 1.0 was introduced during CALIBER 2000. It was improved and upgraded as SOUL 2.0 in January 2009. The database for new version of SOUL is designed for latest versions of MS-SQL and MySQL (or any other popular RDBMS). SOUL 2.0 is in compliance with international standards such as MARC 21 bibliographic format,

Unicode based Universal Character Sets for multilingual bibliographic records and NCIP 2.0 and SIP 2 based protocols for electronic surveillance and control.

4. REVIEW OF LITERATURE

Singh[3] described history of library automation in his articles. Library automation is very important in this information explosion era. Mulla[4], *et al.* have been discussed in details of Usage and performance of various library automation modules in the library automation process. Waghmode[5] has given the automation of acquisition section, reports generating features of SOUL software and use of software in creating statistical reports of library in there article. Aghav[6] has given the details of library automation and networking standards for library automation process. Mohsin[7] has done comparative study of library automation software in his research article.

5. METHODOLOGY

All primary data is collected from Sonubhau Baswant College Central Library for this study.

6. OBJECTIVES OF THE STUDY
* To know the availability of serials in the S.B.College Central library.
* To understand the features of the Serial control module in SOUL 2.0
* To learn the steps of serial control automation.
* To perceive bibliographic format and standards used in SOUL 2.0

7. DATA ANALYSIS

7.1 Frequency-wise and Language-wise Serials

Frequency is a rate of occurrence or repetition of something. Table 1 shows that total frequency wise and language wise serials are available in the library. There three language wise serials are found. Out of 81 serials Marathi (36), Hindi (24) and English (21) serials are available. Maximum serials are monthly (44) and minimum serials are Bi-annual frequency-wise found.

Table 1. Frequency wise and language wise serials

Frequency	Language			Grand Total
	English	Hindi	Marathi	
Monthly	7	16	21	44
Quarterly	3	4	10	17
Bimonthly	1	4	3	8
Weekly	3		2	5
Fortnightly	4			4
Biannual	3			3
Total	21	24	36	81

7.2 Department/Subject Wise and Levels of Publishing of Serial

Serial is a periodic publication with a specific name and articles on varying topics. These articles supplement previous knowledge published in its earlier volumes.

Subject wise and publication level wise details of serials are given in the Table 2. 36 serials are from state level, 44 serials are from national level and one serial is from Internationals level publication. General magazines are maximum, i.e., 22 and minimum two serials are from History subject.

Table 2. Department/subject-wise and levels of publishing of serials

Department/ Subject	Levels of publication			Total
	International	National	State	
General		12	10	22
Marathi			18	18
Hindi		17		17
Economics		7	6	13
Commerce		5		5
English	1	3		4
History			2	2
Grand Total	1	44	36	81

8. STEPS OF SERIAL CONTROL SYSTEM AUTOMATION

Serial control is a sub system of acquisition, processing (organizing) and dissemination of the serial publication in a particular library. The SOUL 2.0 consists of the following six main modules. Each module is further divided into sub modules to cater to its functional requirements: Administration, Acquisition, Catalogue, Circulation, Serial Control, and OPAC. SOUL 2.0 has full-fledged module to tackle variety of issues associated with following types of resources such as 'Please ensure the master data' (Administration – Serial Master) is up-to-date in terms of data-entry window. Following seven sub modules are in serial control systems in SOUL software: Titles (Serials), Suggestions, Subscription, Payment, Check-in, Commercial Binding, In-House Binding.

8.1 Titles Module

This is the first sub module for the title entry. In this module, library staffs enter new titles directly. All types of printed and non-printed subscribed serial entries are found in this module. All bibliographic details are entered in this module. Users can also perform title updating work, indexing work in this module. It is based on MARC 21 format. In this module new title's details are recorded i.e. title of serial, Code No., ISSN No., Location, Publisher, budget, etc.

8.2 Suggestions Module

It is like a title module. All recommendations are entered in this module. It performs new requests, update requests, selections, approvals, and merge the data in main database of library.

8.3 Subscription Module

After the suggestion process is complete then subscription process is starts. In this process library staffs place the order to vendors. Cancellation of orders and forwarding purchase orders, etc. all these activities are performed in this module.

8.4 Payment Module

When suppliers or publishers invoice are received payments process is done. In this module invoice process, payment process, forwarding to account, forwarding to vendors, etc. process is performed by the staff.

8.5 Check-In Module

After the subscription process is completed. Then staff is creating a frequency wise of serials. This is the most important process of serial control. In this process all received and non-received issues get recorded regularly. This software provides us to accessioning features of loose issues of serials. Those accessioned issues can issue to users. In this module non-received issues are automatically goes to reminder process after the completion of lead time period. Reminders are sending by email or by post.

8.6 Commercial Binding and in-House Binding Module

SOUL2.0 software is supported to make sets of loose issues for commercial binding and in-house binding process. When sets are received in library this module allows to accessioning of these sets.

8.7 Standards Supported By SOUL 2.0 Software

SOUL is state of the art library management software widely used across India and neighboring countries. SOUL adheres to internationally acceptable standards like AACR-2, CCF, MARC 21 and ISO 2709. Adoption of Standards in SOUL makes user's database globally acceptable and interchangeable.

9. CONCLUSIONS

In this study researcher found the 81 print journals' record in the SOUL serial control module. Serial control management system in this central library is fully automated. All the operations and activities are made through SOUL software's serial control module. Many features are found in serial control module such as

vendor management, serial budget, title, subscriptions, orders, payment process, check in, reminders, email, bindings, loose issues accessioning, issuing of loose issues and return, etc.

निष्कर्ष

इस अध्ययन के शोधकर्ता ने एसओयूएल पत्रिका नियंत्रब मॉड्यूल में 81 प्रंट पत्रिकाओं का रिकार्ड पाया गया है. इस केन्द्रीय पुस्तकालय मे पत्रिका नियंत्रण प्रणाली पूरी तरह से स्वयंचालीत है। सभी कार्यों और गतिविधियों को SOUL Software के पत्रिका नियंत्रण मॉड्यूल के माध्यम से किया जाता ह। विक्रेता प्रबंधन, पत्रिका बजट, शीर्षक, सदस्यता, आदेश, भुगतान प्रक्रिया चेक–इन, अनुस्मारक चेतावणी या तकाजा, एमेल, जिल्दबंदी, खुले राजपत्र, खुले शेयर जारी करना और विवरणी आदी कई विशेषताएं पत्रिका नियंत्रण मॉड्यूल में पायी जाती है।

REFERENCES

1. AACR2. What is a serial? Cataloger's Reference Shelf CONSER Cataloging Manual, 2014. http://www.itsmarc.com/crs/mergedProjects/conser/conser/module_2_1__ccm.htm/ (accessed on 8 September 2014).

2. Sonubhau Baswant College Library Records, 2014.

3. Singh, Y. Library automation in academic libraries in India: Problems and prospects. *In*: CALIBER-2003, INFLIBNET Centre, Ahemadabad, pp. 1-6. http://ir.inflibnet.ac.in/handle/1944/188/.

4. Mulla, K.R.; Chandrashekara, M. & Talawar, V. G. Usage and performance of various library software modules in engineering colleges of Karnataka. *DESIDOC Journal of Library & Information Technology*, 2010, **30**(3), 13-22.

5. Waghmode, S.S. Automation of acquisition section of Sonubhau Baswant College library with the help of SOUL 2.0: A study. *In:* S. Kadam (Ed.), UGC Sponsored National Conference on Redesigning libraries and information centers in digital era, 2012, Degloor College, Degloor, pp. 361-363.

6. Aghav, U. R. International standards for library automation and networking. *Review of Research*, 2014, **3**(11).

7. Mohsin, S.F. Comparative Study of Library Automation Software (Special Reference of SLIM21 and SOUL). *Online International Interdisciplinary Research Journal*, 2013, 3(1), 168-182.

क्लाउड सेवा: सूचना विज्ञान में इसका महत्व एवं उपयोग
Cloud Services: Application and its Use in Information Science

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सारांश

प्रस्तुत लेख का उददेश्य अलग विचार पेश करना है कि कैसे क्आउड कम्प्यूटिंग सूचना विज्ञान के क्षेत्र में एक सेवा के रूप में अपनायी जा रही है और क्लाउडिंग द्वारा विभिन्न सेवाएं प्रदान की जा रही हैं। सूचना विज्ञान के क्षेत्र में क्लाउडिंग सेवाओं और इसके प्रवेष स्तर को देखने के लिए एक सेवा प्रदाता के रूप में एक ऑनलाइन सर्वेक्षण किया गया था। अनुसंधान प्रक्रिया के लिए आवश्यक प्रोत्साहन प्रदान करने के अलावा विभिन्न शोधकर्ताओं द्वारा एक ही विषय पर पिछले काम को भी ध्यान में रखा गया था। यह अध्ययन बड़े पैमाने पर क्लाउड कम्प्यूटिंग सेवाओं के कुछ प्रसांगिक उदाहरणों के साथ साथ क्लाउड कम्प्यूटिंग और सूचना विज्ञान के क्षेत्र में अपनी सेवाओं के अपयोग का आंकलन है। क्लाउड कम्प्यूटिंग और सूचना भण्डारन और प्रसार के लिए अपनी सेवाओं की बुनियादि समझ पाने के लिए पेशेवरों द्वारा अनुसंधान निष्कर्षों को उपयोग किया जा सकता है।

ABSTRACT

The purpose of the paper is to present the different views of how cloud computing is being adopted as a service in the field of Information Science, and the varied services being provided by the Cloud. An online survey was carried out to look for cloud services and its level of penetration in the field of information science as a services provider. Also previous work on the same topic by various researchers was also taken into account as they provided the required impetus for the research process. The study assesses the cloud computing and the use of its services in the field of Information Science, along with few relevant examples of large scale cloud computing services. The finding can be used by the professionals to get basic understanding of the cloud computing and its services for information storage and dissemination.

Keywords: Cloud computing, information science, digital library, web service, client server

1. INTRODUCTION

It all started with the birth of personal computers and World Wide Web during 70's and early 80's. These inventions provide users access to World Wide Web content while sitting in their homes. During the same period organizations had developed data centres to cater their need of storage and processing[3]. But that didn't prove cost effective as much of their processing power remained unused, on average 5% of their processing power was used. Later with wide availability of DSL, Broadband, and fast transmission speed organizations thought of providing their data centre on lease [1,2]. This led to the advent of Cloud Computing. The term is believed to have originated with George Favaloro a Compaq business executive who described the future of internet business with the term cloud computing. Favaloro having clear knowledge of future visioned that not only business softwares but perceived the concept of "cloud computing based applications" with internet being large scale carrier of information and services[4,5].

Information Technology has changed every aspect of human life. It penetrated every field and Information science is not an exception. In case of information science it changed the way how information is stored, processed and disseminated to its end users. Information science is more vital to development of modern society as it determines what type, when and how information is being delivered to the people. In the world of people, organization and technology, information science sits at the centre. This implies change in technology bring proportional change in information science delivery as any other[6]. The technology is changing with each passing day getting better and cheaper, which brings a proliferated change in the information science each day. With Cloud computing recently getting into science the information science delivery to people has shown considerable amount of change. The cloud technology

at large helped the organizations working at small or large scale, because cloud has freed the information scientists from various overheads in using ICT tools for collection, processing, storage and retrieval, presentation, and communication of information.

This paper presents a picture of how cloud services has affected the information scientists and presents various cloud services used by information scientist in creating, managing and presenting information to satisfy varied user requirements.

1.1 Cloud Computing

As per definition of National Institute of Standards, Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.
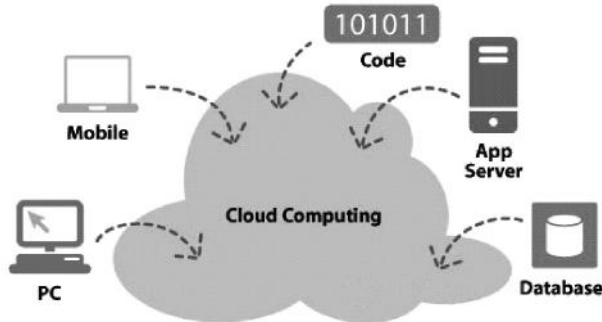
Figure 1. Cloud computing[7].

1.1.1. Characteristics of Cloud Computing

- On-demand self-service: Computing capabilities are allocated to consumer on need basis that is when computing requirements of the consumer arises the services are provisioned without requiring the consumer interaction with cloud service provider.
- Broad network access: Services are provided through internetwork and used through devised standard mechanism.
- Resource pooling: The cloud service providers computing resources are pooled to serve multiple consumers, with resources being assigned dynamically as per user demands.
- Rapid elasticity. The resources allocated are dynamically scaled that is provisioned and released automatically with demand.
- Measured service: The services provided and used can be monitored, controlled and reported, which help in auditing of utilized services.

2. CLOUD SERVICE MODELS

- Software as a Service (SaaS): This is the top most layer of cloud computing service model. Here

applications are provided as service to the end user. Greater compatibility and better collaboration as users will be using same version of application. Example of SaaS includes Gmail, Hotmail, etc.
- Platform as a Service (PaaS): This layer is considered as middle or second layer of cloud computing. Here in this type of service model the platform for running application is provided by the vendor itself while the choice of data and applications rest with the user to decide.
- Infrastructure as a Service (IaaS): This is the lower or the bottom layer of cloud service model. In IaaS the service provider takes care of the service in the form of server, network, storage and virtualization while the user takes care of data, application, operating system and middleware.

3. CLOUD DEPLOYMENT MODEL

- Private cloud: This type of cloud deployment model deals with the single organization. That is services are provided exclusively to a single organization. It may be owned, managed and operated by the same organization or by some third party unit or in some case the combination of two.
- Community cloud: This type of deployment model is used by a group of organization belonging to a single community. By single community we mean organizations sharing same purpose, mission, requirements or policy. This type of model is common in research based organization groups[1].
- Public cloud: This type of cloud deployment model is open to general public usage. It is generally owned or regulated by business, academic or government organizations, or combination of them.
- Hybrid cloud: This type of model is a combination of latter three models, i.e., private, community or public deployment model. The data and application portability issues are addressed by using standardized or proprietary technology.

3.1 Impact of Cloud on Information Science

Cloud computing is a newly emerged field of Information technology. It grants "on-demand network access to a shared pool of configurable computing resources", for information professionals it will be adequate to define cloud computing as a service accessible over web for information management.

Information professionals have incorporated this field of cloud computing in the field of Information science for information handling (i.e., Storage, organization, processing, and analysis of information) and providing better services to suit needs of the knowledge society. With information science being the field concerned with problems of effective utilization of record, integration of cloud computing can open new dimensions. The features can be listed below:
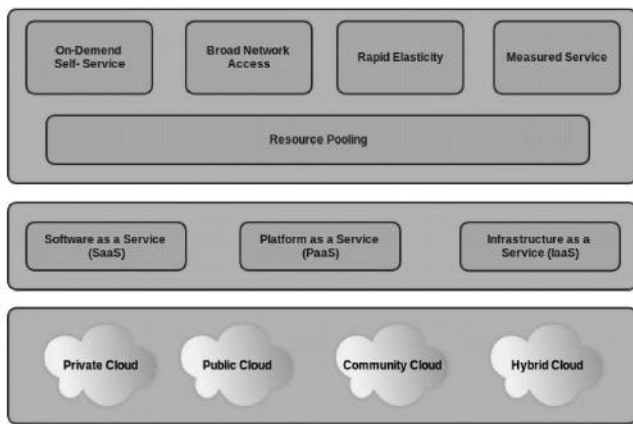
Figure 2. Cloud computing architecture

- Efficiency is what cloud is mostly known for, because servers used for information storage and application hosting are typically shared in the cloud environment, they are able to process multiple instances of programmes concurrently. This accounts for the better handling of resources. In a traditional environment only five percent of available server computing capability was utilized.

- Flexibility and scalability are two important features for which cloud is publicised. While most information management institutes do not have the same high peaks in usage and thus can take advantage of the same. That is server load will be balanced as per the demand and scaled according to the need.

- Information professionals can use cloud services for hosting repositories, journals or institutional bibliographic databases, etc., which can be used to launch digital library, e-journal or other useful services. Example of one such Library using cloud computing to provision their digital library services is Texas Digital Library. They use Amazon's EC2 to duplicate their entire service suite as part of their Data Recovery Plan[8].

- Cloud library offers a simplified way to offer eBooks to your community. Let your borrowers explore and borrow ebooks on the go, at home or in the library, with just a few simple clicks!

- Mobility can be an important factor for efficiency these days. As information management professionals are not concerned about setup and maintenance of applications for information management which is taken care by the cloud service providers. They are only concerned about gathering of information, processing and then uploading to cloud for distribution. Doing all this from anywhere using any web enabled devices.

- The problem of deficiency in technical expertise or small systems staff for some organizations can be a critical one. The cloud solutions are the one that can bridge this gap very effectively. In case of cloud adoption the overhead of installing new hardware, upgrading operating system and software are being taken care of by the cloud vendor himself. As a result, in many cases cloud emerges a less expensive solution to the problem than other traditional computing methods.

- Data loss caused due to fire, flood, local power blackouts, or other natural or computer-related disasters prove disastrous to any organization as information is a critical element of any organization. Information lost is directly proportional to loss of knowledge. Amazon Web Services (AWS) provides one such cloud solution of data banks and is known globally for its block storage, file storage, backup, archive, and disaster recovery.

3.2 Cloud Services in the field of Information Science

There are wide array of cloud services available to satisfy the needs of information collection, maintenance and dissemination. The selection of the service depends on choice and type of service needed. Below are few of the cloud services currently used by people in the field of information science:

- Ex Libris's bX merges data usage from world over researchers to create a service that provides scholarly recommendation. Soon Ex Libris will provide service known as Hot Articles, a free of cost service using bX data that shows what articles are trending in a particular subject[9].

- Mobile phone apps can add value to cloud-based library data. One of the best example being OCLC's WorldCat mobile site which works by directing users to the very nearest library having possession of a certain book needed by the particular user by processing the data retrieved from WorldCat databases, locations of libraries, and tracking user locations.

- StackMap is shelf-mapping software that displays physical location of a book in a library using a pre-recorded call number range. Unlike the radio-frequency identification (RFID) chips, presenting the users a real-time search of a book via location tracking, this service in spite of being less dynamic proves to be much useful.

- Amazon's Elastic Compute Cloud (EC2) is a service hosted by Amazon.com having quality attributes of being scalable, reliable, pay per use, and elastic. Information scientists can use it for the setup of virtual servers. By this the information scientists can boot up a virtual Amazon machine and install software needed by them. The servers can be used as per demand and shutdown as and when desired.

- Dura Cloud is one of the service providers for digital library setup. Dura Cloud is managed by Duraspace which in turn is being managed and operated under Dspace digital library software and Fedora Commons. Fedora Commons is a framework for digital repository. It provides complete service for digital library creation which includes both software and hardware. DuraCloud services are being sold under nominal fee which provides great opportunity to the new comers in digital library creation[11].

- Polaris is a library automation system. Standard acquisition and processing system is also included with the package. Polaris ILS Client License allows the library to connect different PC and printers at no extra cost. The package uses standardised standards like MARC 21 for bibliographic data, XML, Z39.50 for information retrieval, Unicode, etc[11].

4. CONCLUSION

This paper presents various cloud services used in the field of information science and the way they have affected it. With cloud services the information science has reached the targets which were once hard to achieve like how to manage the large volumes of information being generated day after day and how to disseminate that information to the world over web. The unprecedented increase in information technology resources and enormous increase in electronic datasets, information science professionals are facing the serious problem of technical and monetary constraints which were never faced before; moreover information demands are multiplying and to tackle that is becoming tougher. With cloud services the information science professionals have means to manage, catalogue and disseminate this large dataset of information without worrying about the technical and financial aspect. The technical expertise is being provided by cloud service vendors in the form of services which the professionals of information science use as per their requirements, and the financially the cloud services are cheap when compared to the non-cloud based means.

निष्कर्ष

प्रस्तुत लेख सूचना विज्ञान के क्षेत्र में इस्तेमाल विभिन्न क्लाउडिंग सेवाओं को प्रस्तुत करता है और जो तरीके थे उन्होंने इसे प्रभावित भी किया है। क्लाउड सेवाओं के साथ सूचना विज्ञान अपने लक्ष्य तक पहुंच गया है जिन्हें प्राप्त करना एक बार तो बहुत कठिन था कि दिन प्रति दिन उत्पन्न होने वाली सूचनाओं की बड़ी मात्रा का प्रबंध कैसे किया जाए और कैसे दुनिया की जानकारी के लिए उन्हें वेब पर प्रसारित किया जाए। सूचना प्रौद्योगिकी संसाधनों में अप्रत्याषित वृद्धि और इलैक्ट्रॉनिक डाटासेट में भारी वृद्धि, सूचना विज्ञान पेशेवर जो तकनीकी और मौद्रिक बाधाओं की गंभीर समस्या का सामना कर रहे थे, जिनका उन्होंने पहले कभी भी सामना नहीं किया था, इसके अलावा सूचना मांगों में गुणात्मक वृद्धि का होना, और इनसे निपटना और भी मुष्किल होता जा रहा है। क्लाडिंग सेवाओं के साथ सूचना विज्ञान पेशेवरों को सूची और तकनीकी तथा वित्तीय पहलुओं के बारे में चिंता किये बिना सूचना के इस बड़े डाटाबेस का प्रसार करने के लिए प्रबंधन करना था। क्लाउड सेवा वित्ताओं द्वारा तकनीकी विशेषताएं उन सेवाओं के रूप में प्रदान की गयी हैं जो सूचना विज्ञान पेषेवरों अपनी आवश्यकतानुसार उपयोग में लाते हैं, और क्लाउड सेवाएं आर्थिक रूप से गैर क्लाउड आधारित साधनों की तुलना में सस्ती होती जा रही हैं।

REFERENCES

1. Hassan, N. & Ammad, M. R. Cloud Computing: Opportunities and Challenges. *Journal of Modern Science and Technology*, **1**(1), 1999.
2. Bawa, V. History and Use of Cloud Computing, 2013, **1**(1). Retrieved from http://vbawa.blogspot.in/2013/06/how-cloud-computingcame- into-existence.html.
3. Regalado, A. History and Use of Cloud Computing, 2013, **1**(1).
4. Kahn R. E. & Cerf V. G. What is the Internet (And What makes it Work)?, 1999, **19**(1), 3–5.
5. Borko, H. Information science: what is it?. American documentation, 1968, **1**(1).
6. What is Cloud? Retreived from http://www.winky.net.
7. Nuernberg, P.; Leggett, J. & McFarland, M. Cloud as infrastructure at the Texas Digital Library, *Journal of Digital Information*, 2012, **13**(1)).
8. Nuernberg, P.; Leggett, J. & McFarland, M. Cloud as infrastructure at the Texas Digital Library, *Journal of Digital Information*, 2012, **13**(1).
9. Wikipedia. Amazon Web Services, Wikipedia, The Free Encyclopedia. 2014, Retreived from http://www.wikipedia.org/wiki/Amazon Web Services.
10. Corrado, E. M. & Moulaison, H. L. The library cloud pros and cons, *Library Journal*, 2012.
11. Pandya, M. Cloud computing for libraries: A SWOT analysis, 2012.

पुस्तकालयों के लिए उभरती प्रौद्योगिकियाँ
Emerging Technologies for Libraries

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सारांश

पिछले वर्षों में प्रौद्योगिकियों ने हर क्षेत्र में एक नाटकीय परिवर्तन किया है, और पुस्तकालय भी उसी अनुसार बदल गए हैं। आज के पुस्तकालयों ने जगह को रूपांतरित कर दिया है जिसमें यह भौतिक सीमाओं को पार कर साइबर स्पेस में पहुँच गया है। वेब 2.0 के अनुप्रयोगों ने उपयोगकर्ताओं को कंटेन्ट बनाने और प्रकाशित करने में सक्षम बना दिया है। अब उपयोगकर्ता अपने विचारों को इन नयी प्रौद्योगिकियों जैसे कि ब्लागस, विकीस, सोशल नेटवर्कींग आदि की मदद से आदान–प्रदान कर सकते हैं। यह केवल नई प्रौद्योगिकियों को ही नहीं अपितु पुस्तकालयाध्यक्षों और उपयोगकर्ताओं के बीच बदलते हुए सम्बन्ध को भी दर्शाता है। जैसे पुस्तकालय 2.0 ने अपने पूर्ववर्ती को बदल दिया था उसी प्रकार हम एक बार फिर बदलाव के मोड पर हैं। अब नई उभरती प्रौद्योगिकियाँ जैसे वेब 3.0 और सिमेटिक वेब ने इंटरनेट को सूचना नेटवर्क से ज्ञान व सेवाओं के नेटवर्क में तबदील कर दिया है। इसने नई तकनीकों से कन्टेन्ट को सुव्यवस्थित करने की प्रस्तावना की है और नए उपकरणों से सूचना को एकत्रित, समझना और अर्थ व संरचना प्रदान की है। दूसरे शब्दों में, वेब पहले की तुलना में ज्यादा उन्नत हो गई है। बेहतर परिप्रेक्ष्य हासिल करके पता करना कि कौन सी प्रौद्योगिकी वेब 3.0 में उपलब्ध है और इसलिए पुस्तकालय 3.0 में है। हम पुस्तकालयों और वेब की पिछली पीढ़ियाँ (पुस्तकालय 1.0 और पुस्तकालय 2.0) के ऐतिहास पर नजर रखते हैं। उसके बाद यह आलेख पुस्तकालयों में वेब 3.0 की उपयोगिता की दृष्टि से समीक्षा प्रस्तुत करता है। यह वेब वातावरण/वर्चुवल वातावरण में इसकी सेवा प्रदान करने की क्षमता और संभावनाओं का भी विवरण करता है।

ABSTRACT

Over the years, technologies have brought a dramatic change in every field, and libraries are also changed accordingly.Today's library is a transformed space that exceeds it's physical boundaries and reaches into cyberspace. Use of Web 2.0 applications enables users to contribute in creating and publishing content. Now users can share their ideas with the help of these new technologies such as blogs, wikis, social networking sites etc. It reflects not just new technologies, but the changing relationship between librarians and users. Just like how library 2.0 replaced it's predecessor, we are again on the verge of transformation. Now new emerging technologies, such as Web 3.0 and semantic Web transform the Internet from a network of information to a network of knowledge and services. It introduced new techniques for organizing content and new tools to collect, interpret, and add meaning and structure to information. In other words, The web becomes smarter than before. To acquire a better perspective to assess what the technology will be available in Web 3.0 and therefore, in Library 3.0. We take a historical glance at the previous generations of library and Web (Library 1.0 and Library 2.0). This paper also presents an overviews of Web 3.0, from the point of view of its applicability in libraries. It also emphasises the potential and possibilities to provide services in web environment/ virtual environment.

Keywords: Web 3.0, Library 3.0, semantic web, QR code, mobile libraries, cloud computing

1.   INTRODUCTION

Libraries play a crucial role in our communities. A library is created and maintained to provide services to its users, whether it is a school media centre, a college library, a public library, or a special library. Librarians and library staff have a vested interest in serving their users, this provides the very reason for their existence. Libraries have spent the past two decades adding new technology-based services such as online catalogues, computers with Internet access, and self-checkout machines. Libraries represent a new breed of software applications whose aim encompasses categorizing, classifying, archiving and providing access to the vast constellation of web resources.

Now libraries are changing as the customer demands are changing. Staffing levels, service models, access

to resources, and services to the users are changing accordingly.The web is a medium of accessing and sharing information in our modern society. The Internet and web technology have changed the way to interact, acquire, search, investigate and creation of content for users. Nowadays People can get their desired information in few seconds. However, when the web was created, it didn't had these features and facilities. In other words,Web1.0 began as a platform to broadcast information by big industries and organizations. With the development of technology, now web 2.0 provides new features to exchange of information and knowledge amongst users like blog, wikis, tagging sites, social networking sites, etc. ,One step further from these technologies comes Web 3.0. This new "version" of the Web has great potentials. One of its most important features is its ability to combine and integrate web content and services to improve the end-user experiences.

Web 3.0 brings great technologies such as semantic web, cloud computing, mobile devices, new social media applications and new search technologies. Libraries are trying to adopt Web 3.0 into their services through methods such as Resource Description and Access (RDA) tags, metadata and other semantic web developments. The semantic web has changed the way libraries conduct their online services, such as OPACs and federated searching.

Before defining Web 3.0 and it's impact on libraries, however to see what is new about it ? we need to take a look at the characteristics of previous two eras of developments in libraries.

2. WEB 1.0 AND LIBRARY (FIRST ERA)

The first implementation of the web represents the Web 1.0, which, according to Berners-Lee, could be considered the"read-only web." In this era, web presence of library website was generated using HTML codes and it was used to show the services that libraries provide and collections that libraries had.OPAC was used for searching any document in library collection. All the collection of libraries was classified and catalogued manually, after that entered in library software for OPAC search. All the users come to the libraries for issue/return of documents. Open access of resources was provided by the libraries. In this era, goal of library website was to establish an online presence and make their information available to anyone at any time. Library site also have e-mail based feedback form for users.Thus, users were consumers of information in the first generation of library.

3. WEB 2.0 AND LIBRARY (SECOND ERA)

Web 2.0 emphasis on technologies that helped libraries to give opportunities to develop online communities, personalization and democratic management of information and control over it. It provided new tools (such as blogs, wikis, RSS feeds, social networks, content publishing services, etc) to make library virtual space more interactive, collaborative and to deliver user-centric library services. It gave a space where users could not only search for books and journals, but also interact with a community and librarians and share their knowledge. Users could also contribute in development and maintenance of library services by sharing their feedback and views. Now users can also get information about updation of library sites without physcially going to the site with the help of these technologies.

Thus, we can say that Library 1.0 moved collections and services into the online environment, and Library 2.0 moved the full suite of library services into this electronic medium.

4. WEB 3.0 (EMERGING TECHNOLOGY)

The term Web 3.0 is used to explain the next era of web computing and new information age.The term 'Web 3.0' was first coined by John Markoff of the New York Times in 2006[2] and defined it as "a set of technologies that offer efficient new way to help computers to organize and draw conclusions from online data." Tim Berners-Lee's vision of the future web is similar to the concept of Web 3.0. According to Tim Berners-Lee[3] "People keep asking what Web 3.0 is.? I think maybe when you've got an overlay of scalable vector graphics - everything rippling and folding and looking misty-on Web 2.0 and access to a semantic Web integrated across a huge space of data, you'll have access to an unbelievable data resource.".

Experts believe that this technology will make search engines much more smarter than the recent search engines.Web 3.0 technology deals with meaning of data, it provides personalization (e.g. iGoogle) and intelligent search facilities to users.It has capability of obtaining contextual information from web search. In concept, Web 3.0 is able to extract high volumes of information from disparate digital sources either it may be web content to e-mail or files residing on a PC and deliver relevant search results.

For example when simple search engines are used for searching information, It looks for web pages that contains similar keywords. It doesn't tell about relevancy.For example, if searched for the term "Jaguar" the search result end up with web pages about the animal and others about the car, while Web3.0 use meaning behind the searching. For example , if you typed "hill station for vacation for two persons under budget 10,000/-"as a search request, the Web 3.0 browsers shows the list of hill stations and related

information.

The base of Web 3.0 applications resides in the Resource Description Framework (RDF), which is used to describes information so that it can be understood by computer. RDF is used to link data from different websites or databases. When data in RDF form, Uniform Resource Identifiers are used for merg and mapping data from different resources and facilitates development of multisite mashups. Another semantic technology is the Web Ontology Language (OWL), which could also play a key role. It is used for recording how the linked data relates to real world objects. In Berners-Lee's concept, they would exist in the form of metadata.

These approaches enable a Web 3.0 search engine's capable to deliver relevant results. Web 3.0 in terms of semantic web is the third generation of web in which machines will have the ability to read web contents like human beings and also the ability to follow their directions. Therefore, in broader sense, we can say that web 2.0 is bringing Individuals together and information scattered all over the web. Whereas Web 3.0 will bring information together.

5. IMPLICATIONS OF WEB 3.0 TECHNOLOGIES ON LIBRARIES

The vision of Web 3.0 is to create such a medium where there is no difference for users to interact, either may be a human or a machine. Web 3.0 uses semantics (meaning behind data) to organize and search information, this technology makes it more powerful than before. With the help of Web 3.0 applications now libraries not only provide the better services to the users but also make better relationships with users. They should know how to get the requested information and make it available to the user without concerning about the location. Thus, openness among data sources has opened up relationships between users and librarians that previously may not have existed. They should also help the users to use given information. Application of Web 3.0 technologies in libraries refer to as Library 3.0.

Distributed computing, extended smart mobile technology, collaborative intelligent filtering, 3-D visualization, and interaction are key drivers of library 3.0. Distributed computing and smart mobile technologies provide various opportunites to users such as searching of web, management of information, organization of content, anytime any where learning. Collaborative intelligent filtering performed by intelligent agents will enable users to work smarter and collaboratively. These software agents collect all the information about the users searches and their manipulation of data so that they can give high quality services to their users. Virtual 3-D worlds such as Second Life are expected to

become a common feature of the 3-D web, facilitated by the availability of 3-D visualization devices. This 3-D web offers the opportunity for access to increasing amounts of information from disparate sources. As a result, libraries will be able to reach a wider range of information that is available on different kinds of platforms/systems with the help of these technologies, where users can personalize their learning and have an easier access to comprehensive information.

Content creation and distribution by web introduced new technologies such as cloud computing, M-library services, Geotagging for users in the Web 3.0 era. These technologies make possible to access services, generate data and store it. However, mobile phones with their GSM (Global System of Mobile communication) offer new ways to provide information services and QR Codes are used to make connections between the objects in the real world and the web. All have gained a lot of interest among library and information professionals. I am describing few of the prominent features or aspects of this generation in brief.

5.1 QR Codes

A QR code is a matrix barcode readable by smart phones and mobile phones with cameras. Librarians and staff in big research universities, small institutions, public libraries, and museums are experimenting and discovering useful ways to implement QR codes in both their physical and online libraries. QR code of any library website presents the mobile version of the website. Adding QR codes to library OPAC can help to users get the information about resources onto their phone easily without having to take notes. In catalogue records QR code offers patrons basic information about an item, including the title of the book, location and call number, floor where the book to words is available. Users can scan the code and head to the stacks rather than writing or printing. These codes added to print handouts for additional information on mobile friendly sites. QR codes provide a way to copy the scanned content to clipboards (for later copying in another document) and send by e-mail or sms. It provides the ability to save content in favourite list.

Another common use of QR code is to help promote the use of resources of libraries. Useful Audio/video books, songs, lectures, presentations, movies linked with QR codes are easly downloadable and listened on Mobile phones.

QR codes can be used to explain different areas of a library, particularly special collection and unique areas of libraries. It directs to the web page with further information about equipments in the room and their use.

5.2 Cloud Computing

The core concept of cloud computing is shared online computing resources with network applications and it allows them to avoid local hosting of multiple servers and dealing with hardware failures, software installation, upgradation, and compatibility issues. The key driving forces behind cloud computing is to create a set of virtual servers on the available vast resource pool and give it to the clients.

Cloud computing technology offers great opportunities for libraries to build networks among the library and information science professionals as well as other interested people using social networking tools. Libraries are already using some cloud services over a decade. Online searching in databases is an example of cloud applications in libraries. ect. Clouds have great efficiency and speed so it can run multiple programs simultaneously which are helpful for better use of resources. It gives flexibility and scalibities to implement new softwares or new programs instead of installing new server. It may help to increase capacity, reliability, and performance for automation activities. This dynamic and elastic feature of cloud computing helps libraries to rapid growth in collection and maximum use of resources.

Data storage be a main function of libraries, moving the data into cloud help libraries to cooperative collection development, sharing of material, preservation, etc. It also avoid, unnecessary burden on distributed system, that makes library web presence strong. Cloud based services may be used in different ways in libraries such as digital repositories, information retrieval system, citation management, data storage, automation, OPAC, etc.

It provides a solution to deal with lack of technical expertise so cloud vendors can take care of computer hardware, operating system, system upgrades, etc. Thus cloud computing provides an opportunity to extend the impact of library services and the ways to deliver services.

5.3 Mobile Library Services

As the technology has changed, the way of communication has also changed, and libraries are also changed the way to deliver services to their users. Mobile phone has brought a revolutionary change in the life of peoples, Now libraries are also interested to deliver their services by global system of mobile communication (GSM) so users can access these anytime, anywhere. For example, SMS service which is most common feature of a mobile phone, can be used by the library to give information about an upcoming event and new arrivals. Users can access full e-Books and journal articles on their mobile device. These services collectively known as mobile library

services. These are
(a) Text Alerts/Notification
(b) SMS Reference
(c) Virtual Reference Service
(d) Mobile OPAC
(e) Mobile Content Delivery
(f) Mobile Internet

5.4 Geotagging

Geotagging means adding metadata for geographical identification of various media.This metadata contains information about geocode place name, data sources etc. The various media may be images, videos, websites, social media , RSS feed, etc. Most of the cellphones have GPS facility, which allows users to add meta data exactly where the data or image or video was created. So tagging helps users to mark their information for which they are interested.

6. CONCLUSION

Web 3.0 technologies would enable the accessing and management of knowledge structure that are capable to deliver search results with an exceptional level of accuracy, and additional by have the potential to suggest new facts and insights that are emergent in a through analysis of the relationship between sources. Cloud computing, Geotagging, semantic web and the mobile libraries all are playing important roles in the future provision of library and information services. Semantic web provides the option to share, unite, search and organize the web informatian in an easy manner. The most important feature of Library 3.0 is to establish a semantic relationship between all available web contents so the contents can be shared, transferred, and accessible through all modes of communication.

निष्कर्ष

वेब 3.0 प्रौद्योगिकियाँ ज्ञान संरचना के प्रबन्धन और निकासी को समर्थ बनाती हैं जिससे ये असाधारण स्तर की सटीकता से परिणाम देने योग्य हो जाती हैं। और इसके अतिरिक्त इसमें नए स्र. ोतों के बीच संबंधों के विश्लेषण के माध्यम से पैंदा हुए तथ्यों और अंतर्दृष्टि के बारे सुझाव देने की क्षमता है। क्लाउड कम्प्यूटिंग, जियोटैगिंग, सिमेंटिक वेब और मोबाइल पुस्तकालय ये सभी पुस्तकालय और सूचना सेवाओं के भविष्य के प्रावधान में महत्वपूर्ण भूमिका निभा रहे हैं। सिमेंटिक वेब सरल तरीके से वेब सूचना को साँझा करने, एकजुट करने, खोजने और सुव्यवस्थित करने का विकल्प प्रदान करती है। पुस्तकालय 3.0 का सबसे महत्वपूर्ण गुण है कि यह सारी उपलब्ध वेब कन्टेन्ट के बीच में अर्थगत सम्बन्ध स्थापित करता है जिससे इस कन्टेन्ट को संचार के सभी माध्यमों से बांटा, प्रेशित और प्राप्ति किया जा सकता है।

REFERENCES

1. Markoff, John. Entrepreneurs see a web guided by common sense available at http://www.nytimes.com/2006/11/12/business/12web.html?pagewanted=all &_r=0 [Accessed on 26/10/2014).

2. Lee, Timber . Web 3.0 available at http://en.m.wikipedia.org/wiki/Semantic_Web (accessed on 26/11/2014)

3. Strickland,Jonathan : How web 3.0. will work available at http://computer.howstuffworks.com/web-30.htm [Accessed on 28/11/2014]

4. Boar land, John. A smarter web available at http://www.technologyreview.com/featuredstory/407401/a-smarter-web [Accessed on 29/11/2014]

5. Arora, Jagdish.Library 2.0 : Innovative Technologies for Building Libraries of Tomorrow.National seminar on Open access to textual and multimedia content :bridging the digital divide, Delhi, 2009

6. Nail, Umesh & Shivalingaiah, D.Comparative Study of Web 1.0, Web 2.0 and Web 3.0. 6th International CALIBER, Allahabad, 2008

7. Pallis, George. Cloud computing:The new frontier of Internet computing. IEEE Internet Computing, 2010,Vol.14(5), pp 71-73

8. Hamad, A.K.H.Library 3.0: the art of Virtual Library services available at http://www.academia.edu/3270949/Library_3.0_the_art_of_Virtual_Library_services [Accessed on 20/11/2014].

9. García-Crespo, Angel ;Gómez-Berbís, Juan Miguel; Colomo-Palacios,Ricardo and García-Sánchez,Francisco. Digital libraries and Web 3.0:The CallimachusDL approach. Computers in human behaviour, July 2011, Vol.2(4), pp. 1424-1430

10. Gosavi,Nandkishor;Shine,S.Shinde & Dhakulkar,Bhagyashree .Use of cloud computing in library and information science field, International journal of digital library services, July-September 2012,Vol.2(3), pp.51-60

11. Silva, Juan M.; Rahman,Abu Saleh Md. Mahfujur & Saddik , Abdulmotaleb El.Web 3.0: A Vision for Bridging the Gap between Real and Virtual. Proceedings of the 1 ACM International workshop on communicablility design and evaluation in cultural and ecological multimedia system, New York, USA, 2008, pp. 9-14

12. Web 3.0: it's promise and implications for consumers and business available at http:// varizonenterprise.com [Accessed on 20/11/2014].

13. Belling, Anna; Rhodes,Aimee;Smith, Janine ; Thomson,Susan & Thorn,Bernie .Exploring library 3.0 and beyond, available at http://www.libraries.vic.gov.au/download/ exploring library.3.0.pdf [Accessed on 24/11/2014].

14. Rajiv and Lal,Manohar .Web 3.0 in Education & Research. BIJIT - BVICAM's International Journal of Information Technology, July- December 2011, Vol.3(2), pp. 335-340

15. Cummings,Joel ; Merrill, Alex ; Borrelli, Steve. The use of handheld mobile devices: Their impact and implications for library services.Library Hi Tech , 2010,Vol. 28 (1), pp. 22-402

16. Wolfgang Wahlster and Andreas Dengel.Web 3.0:Convergence of Web 2.0 and the Semantic Web. Technology Radar, June 2006

17. Ashford,Robin.QR codes and academic libraries.C&RL News , November 2010

18. Michael E. Casey and Laura C. Savastinuk.Chapter 3,Finding the Road to Library 2.0.Library 2.0: A Guide to Participatory Library Service.Information today.Med Ford, New Jersey, 2007

19. Rubens,N.; Kaplan, D.; Okamoto, T.E-Learning 3.0:anyone, anywhere, anytime, and AI. International workshop on social and personal computing for web supported learning communities, Hongcong, December, 2011

20. Michail N. Giannakos and Vasileios Lapatas.Towards web 3.0 concept for collaborative e-learning. International Multi-Conference on Innovative Developments in ICT, Athens,Greece, 2010

21. Stuart, David .Web 3.0 promises change for libraries. Available at http://www.researchinformation.info/features/feature.php?feature_id=253 [Accessed on 23/9/2014].

22. Key to information available at http://key2information.blogspot.com/2009/09/library-30.html [Accessed on 25/11/2014]

23. Victoria Shannon "A 'more revolutionary' Web". International Herald Tribune.Published: Wednesday, May 24, 2006. 1 available at http://www.iht.com/articles/2006/05/23/business/web.html [Accessed on 20/11/2014].

24. Mills, Keren. M-Libraries information use on move : A report from the arcadia programme, University of Cambridge, available at http:// www.arcadiaproject.lib.cam.ac.uk [Accessed on 25/11/2014]

पुस्तकालय में आर्टिफिशियल इंटेलिजेंस और इसके अनुप्रयोग
Artificial Intelligence and its Applications in Libraries

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सारांश

यह आलेख पुस्तकालयों में आर्टिफिशियल इंटेलिजेंस के विभिन्न अनुप्रयोगों का पता लगाने का प्रयास है। विभिन्न विषय जैसे एक्सपर्ट सिस्टम, प्राकृतिक भाषा संसाधन, पैटर्न रिगानिसन, रोबोटिक्स और पुस्तकालयों के लिए इनके अनुप्रयोग बताए गए हैं। आर्टिफिशियल इंटेलिजेंस के लाभ और हानि की भी चर्चा की गई है।

ABSTRACT

In this paper an attempt has been made to trace the different applications of Artificial Intelligence to the libraries. The various concepts such as expert system, natural language processing, pattern recognition and robotics and their application to the libraries have enumerated. The advantages and disadvantages of Artificial Intelligence have also been discussed.

Keywords: Artificial intelligence, expert system, natural language processing, pattern recognition and robotics

1. INTRODUCTION

The first industrial revolution attempted to create machines that could replace man's physical power. Industrialization has transformed the society totally and brought immediate crises in later development. Infact there are machines that can outperform human beings. Over the centuries man's working ability and thinking process have seen a sea change. The society is becoming increasingly centered on information handling, processing, storage and dissemination, using microelectronic based technologies, today's computers can stimulate many human capabilities such as reading, grasping, calculating, speaking, remembering, comparing numbers, drawing, making judgments, and even interactive learning. Researchers are working to expand these capabilities and, therefore the power of computers by developing hardware and software that can initiate intelligent human behavior. For example, researchers are working on the systems that have the ability to reason, to learn or accumulate knowledge to strive for self-improvement, and to stimulate human sensory and mechanical capabilities. Experts are convinced that it is now only a matter of time; the present generation will experience the impact and utility of new applications based on artificial intelligence in offices, factories, libraries and homes. This general area of research is known as Artificial Intelligence.

2. ARTIFICIAL INTELLIGENCE

Artificial Intelligence has come a long way from its early roots, driven by dedicated researchers. The expression "artificial intelligence" was introduced as a 'digital' replacement for the analog 'cybernetics'. Artificial intelligence began as an experimental field with pioneers like George Boole (1815-1864), Allen Newell & Herbert Simon, who founded the first artificial intelligence laboratory[1]. The emergence of a new field called 'Cybernetics' which has been coined and founded by Norbert Wisner brought together many parallels between human beings and machine. Cybernetics is the study of communication between human being and machine. In general Artificial Intelligence is the subfield of Computer Science concerned with understanding the nature of intelligence and constructing computer systems capable of intelligence action[3]. It embodies the dual motives of furthering basic scientific understanding and making computers more sophisticated in the services of humanity. In other words Artificial Intelligence is the study of mental faculties through the use of computational models.

Artificial Intelligence mainly focuses on understanding and performing intelligent tasks such as reasoning, learning new skills and adopting to new situations and problems. Artificial Intelligence or AI for short is a combination of computer science, psychology, and philosophy. It is concerned with the concept and

methods of symbolic inferences by computer and the symbolic representation of knowledge to be used in making inferences[2].The most popular Artificial Intelligence programs are the Expert systems, which are computer programs that embody human mention of Artificial Intelligence which creates vision of electro-mechanical devices replacing human beings. Hundreds of rules and facts make up AI programmes and these programmes process ideas and knowledge, in several different ways.

3. AREAS OF ARTIFICIAL INTELLIGENCE

Artificial Intelligence focuses on symbolic, non-algorithmic problem solving methods. Though is a young discipline, has transformed the society beyond imagination. The goal of its sub areas, i.e, expert system, natural language processing, pattern recognition, and robotics is to simulate human intelligence with computers. Some of the recent computational techniques and areas that are utilized in developing fields of Artificial Intelligence are discussed below.

3.1 Expert System

Expert System are the knowledge based computerized systems which play a role of intelligence interface or gateway for providing access to database and to obtain relevant information. They range in scale from simple rule-based systems with flat data to very large scale, integrated developments taking many person, years to develop. An expert system is a computer program that provides expert advice, decisions or recommended solutions for a given situation.The different components of expert systems are: knowledge base, inference engine, and user interface.

3.2 Natural Language Processing

One of the long standing goals of computer science is to teach computers to understand the language we speak. The Ultimate generation of computer language is the Natural language. Artificial Intelligence scientists have succeeded in building natural language interface to a large extent using limited vocabulary and syntax. Natural language processing allows a computer to understand the main linguistic concepts within a question or solution. Its goal is to design and build computer that analyze, understand and generate language that human use naturally. The different components of natural language processing are, speech synthesis, speech recognition, machine translation, linguistic approaches, information retrieval and information extraction,

3.4 Pattern Recognition

It is the process of establishing a close match between some new stimulus and previously stored stimulus patterns. This process is being performed continually through the lives of all living things. Pattern recognition is studied in many fields, including psychology, ethology, cognitive science and computer science. Pattern recognition is based on either a priori knowledge or on statistical information extracted from the patterns. The patterns to be classified are usually groups of measurements or observations, defining points in an appropriate multi dimensional space[6-8]. The components of pattern recognition are; data acquisition, pre-processing, feature extraction, model selection and training, and evaluation.

3.4 Robotics

The field robotics is often described as the subfield of AI that is concerned with perceptual and motor tasks. Robot is a mechanical device which performs automation tasks, either according to direct human supervision or a pre-defined program or a set of general guidelines, using artificial intelligence techniques[8].

4. ARTIFICIAL INTELLIGENCE AND ITS APPLICATIONS IN LIBRARIES

Computers provide the perfect medium for the experimentation and application of Artificial Intelligence technology in the present era. AI has more success at intellectual tasks such as computer based game playing and theorem proving than perceptual tasks. Sometimes these computer programs are intended to stimulate human behavior and they are built for technological applications also such as Computer aided instruction (CAI). In many cases the main goal is to find any technique that does the task quick in the better way.

4.1 Application of Expert System in Library Activities

Library activities related to the reading materials, users and staff. The application of Expert Systems where dialogue between staff and users, users and database appears quite promising. An Expert System will help the librarian in realizing the need for an improvement in the productivity. A well programmed Expert System will also improve the quality.

4.1.1 Applications of Expert Systems in Reference Service

Reference service is a prime activity of any library and the Expert System will work as a substitute for a reference librarian. Following are some of the examples of Expert Systems used for Reference Service.

(a) *REFSEARCH:* It is a system that supplies patrons, the recommended sources to lookup for certain question. The system can be used to teach students reference skills or as a computerized aid for practicing reference librarians and information specialists.

(b) POINTER: It was the early successful working application of computer system in the area of reference work. It directs the users to the reference sources; It is not a knowledge based system but a computer assisted reference program.

(c) Online Reference Assistance (ORA): This system intended to stimulate the services of an academic reference librarian for questions of low and medium level, by using several technologies: a videotext like database, computer assisted instruction modules, and knowledge based system. ORA consists of Directional transactions like library locations, services and polices.

(d) ANSWERMAN: An Knowledge based system to help users for reference questions on agriculture topics. It uses series of menus to narrow down the subject of the questions and the type of tool needed. It can function as either a consultation system or as a front end to external databases and CD-ROM reference tools.

(e) PLEXUS: This is a referral tool used in Public Libraries. It includes knowledge about the reference process, information retrieval about certain subject areas, reference sources, and Library users. All the above systems are advisory systems for locating reference source books and factual data.

4.1.2 Application of Expert System in Cataloguing

Cataloguing is one of the oldest library crafts. Recent attempts to automate cataloguing through Expert Systems have focused on descriptive cataloguing because it is considered rule-based (AACR2).There are two approaches for applying artificial intelligence techniques to cataloguing.

(a) A human-machine interface, where the intellect effort is divided between the intermediary and the support system; and

(b) An Expert System with full cataloguing capability linked into electronic publishing system, so that as a text is generated on-line, it can be passed through knowledge based systems and cataloguing process is done without any intellectual input from an intermediary. There have been problem in every attempt to convert AACR2 into the highly structured rules necessary to run the Expert System.

4.1.3 Application of Expert System in Classification

Classification is the fundamental activity in the organization of knowledge. For this reason it is prominent in all systems for organizing knowledge in libraries and information centers. Application of Expert System in the area of classifications in libraries includes the following:

(a) Coal SORT: It is a conceptual browser designed

to serve either as a search or an indexing tool. Coal SORT consists primarily of a frame-based semantic network and the software needed to allow users to display portions of it and to move around in the conceptual structure. The expert knowledge in the system is embodied almost entirely in the semantic network. There is no procedural knowledge in the system.

(b) EP-X: The Environmental Pollution Expert(EP-X) has certain things in common with coal SORT in that both are concentrating on enhancing interface using a Knowledge Based approach. The knowledge base of EP-X consists of hierarchical frame-based semantic network of concepts and a set of template that express the patterns called the pragmatic relationship among concepts. These patterns are referred to as conceptual information.

(c) BIOSIS: BIOSIS uses a knowledge base, including a significant amount of procedural knowledge, to assign documents to categories automatically. It is designed as an indexer aid. BIOSIS uses the information in the titles of biological documents to assign as many categories as possible of those that would be assigned by human indexers. The indexing languages are structured and practical representation of information that can be used to very good advantage of AI applications.

4.1.4 Application of Expert System in Indexing

Indexing of periodicals is another area where expert systems are being developed. Indexing a periodical article involves identification of concepts, to translate these concepts into verbal descriptions, and selecting and assigning controlled vocabulary terms that are conceptually equivalent to verbal descriptions. The reason for automating the intellectual aspects of indexing is to improve the indexing consistency and quality. Based on the information provided by the information provided by the indexer, the systems can arrive at appropriate preferred terms automatically to assign relevant subdivisions. The system can make inferences & based on the inference, it can take appropriate action. Med Index is the best example of indexing system used in the library Indexing activity.

Very few library users have interacted with knowledge based systems. In general, users have had very little contact with these systems due to the fact that most of them are not perfect enough to be used by the everyday library patron.

4.1.5 Application of Expert System in Acquisition

The collection of documents is another integral part of the library. The librarian or the information

officer is key person in this activity. The users of the library have a significant role to play in building electronic collections and that their help and advice should be solicited in the process. Several systems have been incorporated. Monograph Selection Advisor, a pioneering effort in applying this emerging technology in another area of Library Science i.e. building library collection. Specifically, the task modeled is the item-by-item decision that a subject bibliographer makes in selecting monographic. The knowledge base has to be broad enough and the interfacing aspect must be easy enough for the library to get the desired information from the machine.

4.2 Applications of Natural Language Processing in Library Activities

When we think of the term NLP, the first thought one might have is of being able to speak or write in a complete sentence and have a machine process the request and speak. NLP can be applied to many disciplines. To apply this to the field of Library and Information science and more specifically to searching database such as online public access catalogs (OPAC).

Indexing is the basis for document retrieval."The aim of indexing is to increase precision, the portion of the retrieved documents that are relevant; and recall, the proportion of relevant documents that are retrieved". Key words, which have been weighted by the indexer as being basic to human thinking on a particular subject, will be fed into the electronic database in the way that will trigger the citing of an article or book on the computer screen, when these keywords are strung together in the proper sequence by the searcher. The main constraint is the variability in the ways a concept can be expressed4. This variability is partly a matter of semantics, i.e., using the word mobile home vs. trailers. The word trailer has been replaced by the word mobile home in most parts of the country.

Library patrons may not recognize the ambiguity of their search strategy. The use of natural language for Dialog database searches would allow the library patrons to search Dialog database directly, without the assistance of information professional. A patron using an electronic catalog in a library may prefer to have the catalog understand a complete sentence like "Find all your sources which contain an mention of natural language processing for the use of Library and information science." The human librarian has the advantage of being trained in search & query as well as natural language and can act as an intermediary between the machine and the library patron. Some URLs are also case sensitive. In the future, it may be possible to use natural language to access the website also. Library patrons must become computer literate to take the advantage of this new technology.

4.3 Application of Pattern Recognition in Library Activities

In this era of the Internet and distributed, multimedia computing, new and emerging classes of information systems applications have swept into the lives of office workers and everyday people. New applications ranging from digital libraries, multimedia systems, geographic information systems, and collaborative computing to electronic commerce have created tremendous opportunities for information researchers and practioners.

As the application become more overwhelming, pressing and diverse, several well-known information retrieval problems have become even more urgent in this network-centric information age. The most fundamental techniques in IR involves identifying key features in objects. For example, automatic indexing and natural language processing are frequently used to automatically extract meaningful words. Texture, color, or shape-based indexing and segmentation techniques are often used to identify images. For audio and video applications, voice recognition, speech recognition, and scene segmentation techniques can be used to identify meaningful description in audio and video stream.

Several classes of techniques have been used for semantic analysis of texts or multimedia objects. Symbolic machine learning, graph-based clustering and classification, statistics-based multivariate analyses, artificial neural networks, and evolution-based programming are among the popular techniques. In this information age, we believe these techniques will serve as good alternatives for processing analyzing,and summarizing large amounts of diverse and rapidly changing multimedia information. The result from a semantic analysis process could be represented in the form of semantic networks, decisions, rules, or predicate logic. Spreading activation-based inferencing methods are often used to traverse various large-scale knowledge structures4.

One of the major trends in almost all emerging information systems applications is the focus on the user-friendly, graphical, and seamless Human-Computer Interactions .The Web-based browsers for texts, images, and videos have raised user expectation on the rendering and manipulation of information. Recent advances in the development languages and platforms such as Java, OpenGL, and VRML and the availability of advanced graphical workstations at affordable prices have also made information visualization a promising area for research.

4.4 Applications of Robotics in the Library Activities

Robot is "An automatically controlled, reprogrammable, multi-purpose manipulator programmable in three or more axes, which may be either fixed in place or

mobile for use in automation applications." The robots are on scrambling, rolling, flying, and climbing. They are figuring out how to get here on their own.

As libraries provide a growing array of digital library services and resources, they continue to acquire large quantities of printed materials. This combined pressure of providing electronic and print-based resources and services has led to severe space constraints for many libraries, especially academic research libraries. The goal of the Comprehensive Access to Printed Material (CAPM) is to build a robotic, on-demand and batch scanning system that will allow for real-time browsing of printed material through a web interface. The user will engage the CAPM system that, in turn, will initiate a robot that will retrieve the requested item. The robot will deliver this item to another robotic system that will open the item and turn the pages automatically. By using existing scanners, optical character recognition (OCR) software, & indexing software developed by the Digital Knowledge Centre, the CAPM system will not only allow for browsing of images of text, but also for searching and analyzing of full-text generated from the images.

5. ADVANTAGES OF ARTIFICIAL INTELLIGENCE

(a) Can take on stressful and complex work that humans may struggle /can not do;
(b) Can complete task faster than a human can most likely;
(c) To discover unexplored things, i.e, outer space;
(d) Less errors and defects;
(e) Function is infinite[5].

6. DISADVANTAGES OF ARTIFICIAL INTELLIGENCE

(a) Lacks the "human touch"
(b) Has the ability to replace human jobs
(c) Can malfunction and do the opposite of what they are programmed to do
(d) Can be misused leading to mass scale destruction
(e) May corrupt younger generation[5].

7. CONCLUSION

The numerous applications of Artificial Intelligence have been deployed, that demonstrated for the time saving, money to Business sectors, Industrial sectors, Military sectors, Scientific sectors, Academic and Research organizations. AI applications and their utilities will be increasing day by day in many IT oriented educational Institutions, which are contributing AI related recorded information on its AI technology and its utilities in various areas/subject fields. The success in Expert systems field, Natural Language Processing field, Pattern Recognition field, Robotics field has precipitated substantial commercial activity, including the formation of many ventures. The practicability of artificial intelligence in the areas such as cataloguing, classification, documentation, collection development etc appears to be improving year after year. It is sure that in the near future artificial intelligence will occupy in all the spheres with the introduction of competent models with AI techniques. Library and Information Science will be greatly benefited by the development of the efficient expert system for technical services as well as Information processing and management.

निष्कर्ष

आर्टिफिशियल इंटेलिजेंस के कई अनुप्रयोग हैं जो कि व्यावसायिक क्षेत्रों, औद्योगिक क्षेत्रों, सैन्य क्षेत्रों, वैज्ञानिक क्षेत्रों, शैक्षिक और अनुसंधान संगठनों के लिए समय बचत और पैसे की बचत को दर्शाते हैं। आर्टिफिशियल इंटेलिजेंस के अनुप्रयोग और इनकी उपयोगिता सूचना प्रौद्योगिकी सम्बद्ध शैक्षणिक संस्थानों में दिनोदिन बढती जा रही हैं जो कि विभिन्न क्षेत्रो और विषय क्षेत्रों में आर्टिफिशियल इंटेलिजेंस प्रौद्योगिकी और इसकी उपयोगिता से आर्टिफिशियल इंटेलिजेंस संग्रहित सूचना में योगदान करता है। एक्सपर्ट सिस्टम क्षेत्र, प्राकृतिक भाषा संसाधन क्षेत्र, पैटर्न रिगानिसन क्षेत्र, रोबोटिक्स क्षेत्र की सफलता नें वाणिज्यिक गतिविधियों में काफी बढोतरी की है। जिसमें कई उद्यमों का गठन भी है। आर्टिफिशियल इंटेलिजेंस के प्रयोगता के क्षेत्र जैसे सूचीकरण, वर्गीकरण, प्रलेखन, संग्रह विकास आदि साल दर साल बेहतर हो रहे हैं। यह भी स्पष्ट है कि निकट भविष्य में आर्टिफिशियल इंटेलिजेंस ए आई तकनीक के सक्षम माडलों के इस्तेमाल से सभी क्षेत्रो में जगह हासिल कर लेगी। पुस्तकालय एवं सूचना विज्ञान तकनीकी सेवाओं और सूचना प्रसंस्करण और प्रबंधन में सक्षम एक्सपर्ट प्रणाली के विकास से काफी लाभान्वित होगा।

REFERENCES

1. Kumar, P.S.G. Information technology: applications. New Delhi: BRPC. 2004, 401-425p.
2. Nil's, J.Nilson. Artificial intelligence. New Delhi: Harcourt , 1998, 280-281p.
3. Patrick Henry Winston. Artificial Intelligence, Addison Wesley, New Delhi: 1999, 10-12.
4. www. aaai.Org /AITOPICS, 2014.
5. www. sstramel.blogspot.in/2009/09/artificial-intelligence-advantages[Accessed on 04/11/2014].
6. www.wiki.org/Pattern Recognition [Accessed on 04/11/2014].
7. www.wikipedia.org/expertsystem [Accessed on 04/11/2014].
8. www.wikipedia.org/Robotics [Accessed on 04/11/2014].

पुस्तकालय और सूचना केन्द्रों में त्वरित प्रतिक्रिया कोड के अनुप्रयोग
Applications of Quick Response Code in Libraries and Information Centres

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सारांश

यह आलेख आधुनिक पुस्तकालय और सूचना केन्द्रों में त्वरित प्रतिक्रिया (क्यू आर) कोड प्रौद्योगिकी और इसके अनुप्रयोगों का वर्णन करता है। एक त्वरित प्रतिक्रिया कोड एक प्रकार से दो डाइमैन्शनल बारकोड है। क्यूआर कोड डेन्सो–वेव कोरोपोरेशन द्वारा जापान में 1994 में विकसित किया था। क्यू आर कोड मूल रूप से एक अंतरराष्ट्रीय मानक (आई एस ओ / आई ई सी 18004) का अनुसरण करता है। सूचना प्रौद्योगिकी के युग में पुस्तकालय और सूचना केन्द्रों में क्यू आर कोड बहुत शक्तिशाली और किफायती उपकरण है। क्यू आर कोड प्रौद्योगिकी के कार्यान्वयन में मूलत तीन वस्तुओं (स्मार्ट फोन या कैमरे के साथ कम्प्यूटर, इटरनेट कनेक्शन और क्यूआर स्केनिंग साफ्टवेयर) की आवश्यकता है आज आधुनिक पुस्तकालय और सूचना केन्द्र क्यूआर कोड के उपयोग से विभिन्न प्रकार के संसाधन जैसे ई–पुस्तकें, ई–पत्रिकाओं, ई–जर्नल, ई–शोधप्रबन्ध और ई–थीसिस उपयोगकर्ताओं द्वारा आसानी से प्राप्त किए जा सकते है। यह आलेख पुस्तकालयों और सूचना केन्द्रों में त्वरित प्रतिक्रिया प्रौद्योगिकी के कार्यान्वयन में होने वाली चुनौतियों का भी वर्णन करता है।

ABSTRACT

This paper describes the quick response (QR) code technology and its applications in modern libraries and information centres. A quick response Code is a type of two dimensional barcodes. The QR code is first time developed by Denso-wave corporation, Japan, in 1994. The QR code basically follows an international standard (ISO/IEC18004). In the ICT era QR code technology is a very powerful and cost effective tool for libraries and information centres. To implementation of QR code technology basically three things (Smartphone/Desktop with a camera, QR code scanning software and Internet connection) are required. Today, modern libraries and information centres provide different type of e- recourses like e-books, e-journals, e-magazines, e-dissertations and e-thesis, etc using QR code to easily access by users. This paper also describes the challenges to implementation of QR code technology in the libraries and information centres.

Keywords: Quick response code, QR code, QR code reader, QR code in libraries, digital libraries

1. INTRODUCTION

In the 21st century modern libraries and information centres adopted information and communication technology (ICT) to manage e-resources and services. Today, libraries and information centres products like books, journals, magazines, catalogues, newsletters and electronic items are using some black spots known as quick response Code. A QR code is a two dimensional code first time designed for automotive industry. QR code was developed in 1994 by Denso-Wave Corporation, Japan. The QR code follows an international standard (ISO/IEC18004). In electronic environment it's a powerful tool for modern libraries, publishers, web developeres and information professionals to manage resources and services in cost effective manner. Basically, a QR code shows a new horizon for several applications within the digital information world in education, libraries, content management, IT and business fields. Modern libraries are using QR Code to provide educational resources to the academic community. The QR code technology with smart phone is easy to implement and use in the libraries to enhance the connection between library and users. Actually QR codes store information in binary data format. So, QR codes are capable to store all kinds of information like texts, ISBN, SMS, e-mail code, URLs, websites, contact details like visiting cards, dates and calendar entries, telephone numbers and email messages. In the digital era the many utilities of smart phones have enhanced the applications of QR code in the libraries to provide easily access with high speed at low cost to the maximum users. Present time many Institutions/

Universities published QR code on journals, magazines and newsletters for users In publication field almost all Publishers also have taken initiatives to publish the QR codes on books, journals, magazines and newspapers to know the authors, contents, articles and link these to the website.

1.1 What is QR Code ?

A QR Code is the trademark term for Quick Response Code. A QR code is a two-dimensional code (2D code) which can contain hundred times more data OR information than barcodes. QR codes are also known as two dimensional barcodes. QR code was developed in 1994 by Denso-Wave Corporation, Japan to safely and easily identify components. QR Code is approved as an ISO international standard (ISO/IEC18004) in 2000. Quick Response Codes are two dimensional barcodes which are generated by the QR Code generator and are read by the QR code readers by scanning using smart phones.

Actually a QR code consists of the same back modules which are arranged in square pattern against the white background. QR Code are capable of storeing information (numbers, texts, hyperlinks, contact details, calendar information, e-mail addresses, phone numbers, SMS, maps, social network information, etc in any direction, i.e horizontally and vertically. QR code stores maximum information, up to 7089 characters numeric only, 4296 characters of alphanumeric and binary (8 bit) 2953 bytes in single barcode and single code can be divided in to 16 portions of a code at maximum. A QR Code is capable of reading at high-speed in 360° (Omni-directional).

1.2 QR Code Tools

For implementation of QR technology three things are needed in to successfully decode a QR code:
- Smart phone, Desktop (with a camera).
- QR code Scanning Software.
- Internet Connection

2. CHARACTERS OF QR CODE

A QR Code is a powerful tool to store and manage
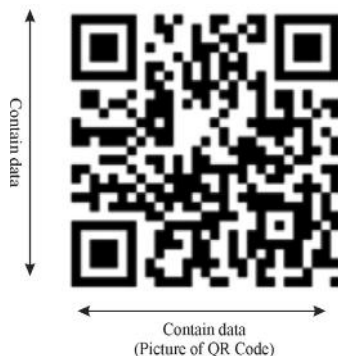
Figure 1. Network Design.

digital information in ICT era. The QR Code has following characters.
1. High storage capacity.
2. High reading speed with CCD reading.
3. Easy to implementation and use in libraries.
4. Supports different languages (English, Russia, Japanese, Chinese, Hindi, etc.)
5. Readable in all direction (360 degrees)
6. It's based on ISO standard (ISO/IEC18004)
7. Small printout size (capable to save the space by carrying information both horizontally and vertically).
8. Capability with Kanji and Kana (capable of encoding JIS level1 and level 2 kanji character set)
9. Capability of damage resistant (Capability to check the error).

3. QR CODE GENERATOR

A QR code generator is a computer software which stores respective data into a QR code like a text OR a website address. QR code may be generate free of cost by different OR code generator software. It can be easily done with online QR generator Goqr. me: we just create a QR code by typing respective data/text and download it as high resolution PNG or vector graphic (SVG, EPS) format. Now, we may print free QR code or embed it on our website to make it available to users. Also, QR code can be generated free of cost using Google QR code generator. The following websites have been generating the QR code without any cost.
1. www.qrcode.kawa.com
2. www.delivr.com/qr-code-generaor
3. www.paxmodept.com
4. www.flick2know.com
5. www.createqrcode.appspot.com

4. QR CODE SCANNING/READING

In libraries and information centres a simple barcode scanner or a mobile phone with camera and an appropriate reader app which supports the QR code standard is needed to scan a QR code. QR code reader apps are made available by manufacturers in different mobile devices, which are mostly free. QR code readers (phone) are ScanLife, BeeTagg, ReadLaser, AT&T Code Scanner, Microsoft Tag, i-Nigma and Kaywa.

5. APPLICATIONS OF QR CODES IN LIBRARIES AND INFORMATION CENTERS

Today, library and information centres promotion of QR codes is also important to be considred as mobile library catalogue we has just been released. Application of QR code for our mobile catalogue, one of the best example which can be added to a mobile device home

screen for future reference as well as on our library wWebsite. Applications of QR codes in libraries and information centres are shown in Fig. 1.

Figure 1. Applications of QR codes in Library and Information Center

1. One of the best applications of QR code in Library catalogue to individual records of books and journal titles available on the shelves with a QR Code.

2. QR code are read by users and users can save the title, author and call number of the book users are viewing on the library catalogue to help that find its location on the shelves.

3. E-books: Today, some new e-books available to reading by users in reputed library and users can be accessed via these QR codes.

4. QR codes are published on shelf-labels and library catalogues linking to full text e-books and e-journals..

5. Reservation of Rooms: QR code placed on study room doors connecting to room reservation forms

6. Library floor plan and guide: Application of QR code in providing library floor plans that library user directly to an MP3 audio tour on that subject floor.

7. Library website (a URL): Present time many libraries and information centers have their websites with the QR Code to linking the respective documents through user smart phone and user can access the library websites through their smart phones..

8. Application of QR codes in the digital/virtual world for blogs, online catalogues and webpage's. Central Library of IIT Jodhpur using QR code to users convenience.

9. Library users orientations: QR code is very useful to provide linking to library audio tours for library users orientations.

10. References for library staffs: QR Code placed on library staffs directory page that go to mobile friendly sites for later reference.

11. QR Code placed on audio book cases for authors interviews or books for reviews.

12. Library and Information Centres: Today, library and information centres exhibit through a QR code link to songs, videos, websites, users survey, contests/quiz, etc. or other relevant information that augments the exhibits.

13. Library and information video tutorials: In Digital era, library and information centres provide audio/video tutorials to users by individual videos or create a QR code to a YouTube playlists of videos.

6. CONCLUSION

In electronic environment a QR Code is a powerful tool to manage some most important operations of libraries and information centres. QR codes have wider applications compared to simple barcodes. A QR codes is very easy to implementations and library staff easily generates these codes to apply in the library operations. Actually QR codes are most widely used in business area for marketing and promotion. Today, library and information centres can also apply these benefits of QR codes using on catalogues, reference service, staff directory, posters, bookmarks, range end signs linking to library guides, e-books, library websites, library blog, library logo, QR Codes linking to library guide video tours.

निष्कर्ष

इलैक्ट्रॉनिक वातावरण में, पुस्तकालय और सूचना केन्द्रों के कुछ सबसे महत्वपूर्ण कार्यो के प्रबंधन करने में क्यूआर कोड शक्तिशाली उपकरण है। क्यूआर कोड के सरल बारकोड की तुलना में व्यापक अनुप्रयोग है। क्यूआर कोड का कार्यान्वयन बहुत आसान है और कर्मचारी पुस्तकालय के कार्यो में इन कोड को आसानी से लागू कर सकते हैं। असलियत में क्यूआर कोड का व्यापार के क्षेत्र में विज्ञापन और उन्नति के उद्देश्य व्यापक उपयोग किया जाता है। आज, पुस्तकालय और सूचना केन्द्र क्यू आर कोड को सूची, संदर्भ सेवा, कर्मचारी सूची, पोस्टर, बुकमार्कस, रेंज अंत संकेत को पुस्तकालय गाइड, ई–किताबें, पुस्तकालय वेबसाइटों, पुस्तकालय ब्लॉग, पुस्तकालय चिन्ह, क्यूआर कोड को पुस्तकालय गाइड वीडियो पर्यटन से जोड कर उपयोग कर रहे हैं।

REFERENCES

1. Burkya, Sridhar. Java script based quick response code generator interface. Electronics for you, 2012, 129-131

2. Bala, A & Gupta, B.M. Perceptions of health professionals regarding use and provision of LIS through mobile technologies . *DESIDOC J. Lib. Info. Techno.,* 2010, **30**(3), pp.7-12.

3. Ruleman, A.B. Global trends in mobile technology and their impact on your library. The Christian librarian, 2012, **55**(1),23-28.

4. Baker, Laura. Making Physical Objects Clickable: Using Mobile Tags To Enhance Library Displays. Journal of library innovation, 2010, **1**(2),22-28.

5. Goria, Sunil. Building website for mobile phone users of an Indian agriculture University Library: Amodel. *DESIDOC J. Lib. Info. Techno.,* 2012, **32**(4), pp.358-364.

6. Panda, Siba Prasad & Mahapatra, R.K. QR code: An innovative use in library and information science. *VSRD Int. J. Comput. Sci. Info.Techno.* 2013, **3**(9).

7. Hampton, D., Peach, A. & Rawlins, B. Reaching mobile users with QR codes. kentucky libraries., 2011, **75**(2) .pp.6-10.

8. Jun-Chou Chuang, Yu-Chen Hu & Hsien-JuKo. A Novel Secret Sharing Technique Using QR Code. *Int. J. Image Proc.*, **4**(5). http://www.cscjournals. org/csc/manuscript/Journals/IJIP/volume4/Issue5/IJIP-263.pdf

9. Susono, Hitoshi & Shimomura, Tsutomu. Using Mobile Phones and QR Codes for Formative Class Assessment. Current developments in Technology Assisted Education., 2006, pp.1006-1010.

10. Lippincott, J.K. Mobile Technologies, Mobile users: Implications For Academic Libraries. A bimonthly repot on research library issues and actions from ARL,CNI AND SPARC, 2008.

11. Trivedi, Mayank & Suhtar, Vishnu. A plan of m-library for Smt. Hansa Mehta library: A study. *Inter. J. Info. Commun. Technol. Res.,* 2011, **1**(3). pp.91-95.

12. Mckiernan, G. JIS/MLA : An introduction to QR codes. Retrieved from http://mobile-libraries. blogspot.com/2009/08/introduction-to-mobile-web. html (15/10/2014).

13. Sahay, Niraj & Mishra, Ashish. QR Code: How Useful. Electronics for you, 2012, 116-118.

14. Thomas, L.C.(2010). Service standards for the mobile/social library. *J. Web Lib.*, 4, 449-451.

15. http://138.38.0.49 (Access on 30/10/2013).

16. www.iitj.ac.in (Access on 22/12/2014).

17. www.oclc.org (Access on 22/12/2014).

18. http://catalog.loc.gov/ (Access on 22/12/2014).

19. www.wikipedipa.org (Access on 05/11/2014).

20. http://goqr.me (Access on 14/09/2014).

21. http://m.crln.acrl.org (Access on 02/05/2014).

एम–लाइब्रेरी सेवाओं की शुरुआत पुस्तकालयों के लिए एक कार्य योजना
Introducing 'M-library' Services: An Action Plan for Librarians

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सारांश

इस आलेख का उद्देश्य एम–पुस्तकालय सेवा (मोबाइल (फोन) लाइब्रेरी) की शुरुआत के लिए एक कार्य योजना का वर्णन करना हैं। यह मोबाइल फोन के माध्यम से इंटरनेट उपयोग करने और पुस्तकालयों के पारंपरिक रूप से पुस्तकालय 2.0 से स्मार्टफोन मोबाइल फोन तक के विकास के वर्तमान परिदृश्य के अवलोकन करने का प्रयास करता हैं। यह पुस्तकालयों में मोबाइल प्रौद्योगिकी के अनुप्रयोगों की चर्चा करता है और एम–पुस्तकालय की योजना बनाने में होने वाले तथ्यों का विश्लेषण करता है। एम–पुस्तकालय के प्रारूप तैयार करने और स्थापत्य में होने वाली आवश्यक गतिविधियों का भी वर्णन किया गया हैं। यह निष्कर्ष निकलता हैं कि आधुनिक पुस्तकालय पुस्तकालयों का ऐसा मिश्रण हैं जो आसानी से पारंपरिक, लाइब्रेरी 2.0 और मोबाइल के वातावरण में कार्य कर सकते हैं और उपयोगकर्ताओं की आवश्यकताओं और प्रतिक्रिया के अनुसार खुद और पुस्तकालय सेवाओं को अनुकूलित कर सकते हैं।

ABSTRACT

The purpose of this paper is to describe an action plan for introducing M-Library services (Mobile (phone) Library). It attempts to overview the current scenario of internet access through mobile phones and also the evolution of libraries from traditional to Library 2.0 to Smartphone environment. It discusses the applications of mobile technology in libraries and enumerates the points that should be considered while planning for an M-library. The activities necessary for designing and implementation of an M-library are also described. It concludes that the 'Modern Librarians' will be a hybrid of the libraries that can seamlessly function in Traditional, Library 2.0 and Mobile environments and can adapt themselves and the library services easily according to users' needs and feedback.

Keywords: Mobile library, M-library, library services, planning, design and development

1. INTRODUCTION

According to a report published by the Internet and Mobile Association of India[1], the number of people using internet on their mobile phones is 200 million. This is nearly 10 times the population of Australia. While Indians primarily use the internet on mobile phones for communication, mainly in the form of email, social media is its most important driver. This facet of the IMAI report can be corroborated with data from other sources such as Economic Times[2], according to which, India has more than 100 million active Facebook users since March 2014. Internet penetration in India is driven largely by mobile phones, and currently some of the cheapest and most basic hand-sets also offer access to the internet. The Economic Times news report also states that college-goers remain the largest users of the internet in India, followed by young men. Students and youngsters are the most techno-savvy individuals. With the technological advances and increase in Smartphone use, people can stay connected not only with other people but also with information whenever they want and wherever they are.

The smartphones are no longer just phones. With the Graphical User Interface and ability to access Internet through them, one can play games, video chat, access e-mails, conduct Internet searches, be active on social networking sites and also shoot and share photos and videos. Thus, smartphones have literally brought information, learning and entertainment together in the palms of the users.

Libraries have always kept pace with all the technological developments. With the advent of Internet, libraries also evolved. They started using the Internet successfully to deliver services like Reference service, Alerts, SDI, Notifications, etc. The librarians in Library 2.0 used social networking to enhance their traditional role by contributing, sharing and collaborating with the users. But, the current situation demands a further

evolution. Now the libraries should explore smartphones as a means to connect with their users.

According to Jason Griffey[3], if librarians want to hold on to their role as Information professionals, they need to be able to reach out to users in their preferred method of Communication. Therefore, now it has become imperative for librarians to adapt themselves and metamorphose into 'M-Librarians' (Mobile Librarians).

While this metamorphosis is going on, librarians should remember that they will still need their traditional skills because the face-to-face interactions with users are never really going to disappear. The new age librarians who will be able to simultaneously function in Traditional, Library 2.0 and Mobile environments will be the true 'Modern Librarians'.

2. APPLICATIONS OF MOBILE TECHNOLOGY IN LIBRARIES

(a) Services on the GO!: With mobile technology, library services and resources can be provided to users anytime, anywhere. They can have a 24×7 access to the library catalogue, digital resources and services through their mobile phones. The need of a computer for all these functions will be eliminated with the mobile library portals.

(b) Mobile Library 2.0: Library services and other social interactions can happen through Web 2.0 applications designed for mobile phones.

(c) Instant Communication: Libraries can establish communication channels with the users easily for real time communication, thus extending the library services beyond the constraints of library working hours.

(d) Information Retrieval: Libraries can provide current awareness service and resources to users instantly. Links to the resources will help the users to access them whenever and wherever they want to. This will greatly facilitate information retrieval and reference services.

(e) Library Marketing: Mobile phones are an ideal tool for marketing of library services and also resources and for increasing the visibility of the library.

(f) E-book Readers: Smartphones also can function as e-book readers eliminating the need to carry separate readers like Kindle.

(g) Embedded Librarianship: Networking of librarians and users through mobile technology will help the librarians to proactively involve themselves with the users' needs and contribute to their information seeking exercises. This is the basic principle of the new concept of 'Embedded Librarianship'.

(h) Image of the library: Proactive embedded librarianship will help to change the image of the library from "being there" to "being out there" where and when needed.

(i) Librarians' self esteem: The change in image will increase the librarians' self esteem as they will be appreciated for their ability to adapt to the changes occurring on the technology front.

2.1 Planning for an M-Library

In order to introduce M-Library services, librarians should have a proper plan and develop certain skills. Points that should be considered while planning M-Library services are:

• Profile of the library users
• Percentage of the users regularly using Internet through mobile phones for scholarly activity
• Variety of browser technologies in users' mobile phones
• Information needs of users
• Services required by them

The mobile services should first be started on a pilot scale to check viability and then only a full scale M-library can be launched. Certain activities necessary for design and implementation of an M-library include:

• *Develop mobile compatible version of library website*

Mobile compatible version can provide access to a variety of functions like library services, library catalogue, digital resources, social networking tools, information literacy tools, help in the form of live chats or links like how to.

The mobile devices of today have overcome the limitations like screen size, processing speed and storage capability. The speed of the internet has also increased considerably. In spite of these developments, defining the amount and format of information that is appropriate for the mobile phone screens remains an important factor to be considered for a successful M-library.

• *Create mobile compatible library catalogue*

Library catalogues on the mobiles can help in searching information, downloading digital resources, renew issued items, reserve items, etc. M-catalogues can be an effective tool for attracting users by uploading book covers, displaying list of last ten catalogued books, etc. A survey of users revealed that majority of respondents would like to use small screen devices, such as PDAs or web-enabled cell phones to search a library OPAC.

• *Subscribe to mobile compatible library collections*

Many e-books are now available for access on mobile phones. Many sites and databases develop their mobile versions that are better suited for viewing on mobile phones than the original websites. Encyclopaedia Britannica, WorldCat, Medline Plus are examples of

some of the free resources that have their mobile versions. Databases like EBSCO, SciVerse, IEEE Xplore, JSTOR and RefWorks also have their mobile phone versions. Some of the scholarly databases like Ebscohost and Web of Science give free access to the mobile versions of their sites while for some of the other databases like Cochrane Reviews, Lexicomp and Natural Standard access to mobile versions has to be purchased separately. Also, some databases do not give full text access through mobile phones. For example, in IEEE Xplore mobile version, patrons can conduct simple searches, view up to ten article abstracts for each search, and e-mail a link to full text of articles to themselves for later viewing on a computer.

It is also important to note that due to certain technological limitations like that of the processors, many scholarly databases cannot be fully accessed through mobile phones. But this problem is fast becoming redundant due to the evolutions taking place in mobile technologies.

- *Discover and download freely available mobile applications (Apps) for learning to suit the users' needs*.

Many free mobile apps for learning are already available for downloading, eg., History: maps of the world[5], iSSRN[6], Periodic table explorer[7], OECD Factbook[8], Planets[9], Shakespeare[10], Wordweb dictionary[11], etc. Many more such apps can be discovered and downloaded from services like Google Play, AppBrain, AppStore, Getjar, or Mimvi. But an important point to consider is that they should work for various devices available in the market, i.e., they should be device independent.

- *Develop mobile compatible library tours (audio and/or video) and other information literacy tools*

Podcasts of information about library collection, services and how to make best use of the library will be very helpful to users. Videos of library tours will prove to be an excellent guide for large libraries.

- *Use Web 2.0 applications*

M-Librarians should be an active part of the social networking circuit to be connected to the users at all times. Various Web 2.0 tools that can be used and their applications in library are:

- *Instant Messaging Services (IMS)*: IMS and SMS can be very effective tools to push content to users in the form of various alerts. They are also useful to receive and answer enquiries and reference queries, issue reminders, receive renewal and reservation requests, etc. They can also be used for Current Awareness and SDI service delivery.
- *Social networking*: Facebook, LinkedIn and Twitter can be used to stay connected with the users

24×7. They can also be used to push content and for reference and other queries. Photo sharing is also possible through services like Flickr and Instagram. Bookmarking sites assist in tagging useful information. Blogs are an excellent means to have a dialog with the library users and also to push information and content to them. Skype allows real time video chats to help users.

- *Quick Response (QR) Codes*: QR Codes are 2 dimensional barcodes that are easily scanned using mobile phones. They enable a connection between digital and analog information. Information such as text or an URL can be converted into a 2D barcode. This process is called qurification. When this QR code is scanned by the mobile phone, it is dequrified into the coded text or URL. For example, if library brochures are printed with a QR code, users can scan it and the information will be in their mobiles for further use. QR codes can also represent long URLs or bibliographic information so that users can connect to the catalogue or library resources through QR codes.
- *Augmented Reality (AR):* It is the application of computer-generated imagery embedded into live video streams. By using AR technology, information about the objects within a user's surrounding environment is stored and then retrieved as an information layer on top of a live real world view. For example, when someone finds a book in the library catalog, they can snap a QR code or unique image of the book to store the information about that book. Then the user can be directed to a specific section of the library, and once the user is in the right section he/she can use the mobile device to scan the book spines to start being guided towards the book they want.

This can also be used by the librarians for shelf reading by adding a book tag called ShelvAR. Then once a shelf is scanned through a mobile device, it will show wrongly shelved books as red colored cross marks and also show the direction in which the book has to be moved to place it in its proper place. A video of this technology is available on YouTube[12].

For efficient delivery of M-library services, librarians should possess or develop certain skill sets. They should be able to conduct user surveys in order to find out the basic information about users' profile and needs and the various devices used by them to access internet. Librarians need to be very proficient in communication through social media in order to use these tools to provide M-library services. They should also have various IT skills in order to maintain and use the mobile version of the website and library catalogue and to discover and use freeware mobile apps for learning. It would be very beneficial if they

can create information literacy podcasts on their own instead of outsourcing such work.

Development of an M-library can be achieved by the integration of the library systems and databases through an application system that allows information processing and delivery to a smaller device like a mobile phone. Designing an M-library requires new approach by the developers. Cao et al have discussed in detail the challenges faced and the solutions applied during design and development of the Athabasca University M-Library.

3. CONCLUSIONS

The evolution of smartphones and the change in users' preferred mode of communication have posed challenges for traditional library. In order to survive in this environment, libraries need to evolve and be on the same technology plane as their users. They should figure out how to best serve the users with the help of this new mode of communication. They must explore all possibilities of seamless communication with the users so as to bridge the gap in the social interaction with the users. Using Web 2.0 applications that match the users' needs through mobile internet and promotion of the available mobile resources and services is the key to survival.

But even in this age of mobile internet, traditional libraries will not disappear completely. The 'Modern Libraries' will be a hybrid of the librarians that can seamlessly function in Traditional, Library 2.0 and Mobile environments and can adapt themselves and the library services easily according to users' needs and feedback.

निष्कर्ष

स्मार्टफोन के विकास और उपयोगकर्ताओं के संचार के पसंदीदा माध्यम में बदलाव ने पारंपरिक पुस्तकालयों के लिए चुनौतियाँ पेश की है। इस माहौल में टिके रहने के लिए पुस्तकालयों को उपयोगकर्ताओं के तकनीकी स्तर के अनुसार विकसित करने की जरूरत है। इन्हें नए संचार के माध्यम से उपयोगकर्ताओं की बेहतरीन सेवा के रास्ते बताने चाहिए। इन्हें उपयोगकर्ताओं के साथ निर्बाध संचार की सभी संभावनाओं का पता लगाना चाहिए ताकि उपयोगकर्ताओं से होने वाले सामाजिक संवाद की दरार को भरा जा सके। वेब 2.0 अनुप्रयोगों की सहायता से उपयोगकर्ताओं की आवश्यकताओं को मोबाइल इंटरनेट से पूरा किया जा सकता हैं और उपलब्ध मोबाइल संसाधनों और सेवाओं को बढ़ावा देना अस्तित्व की चाबी हैं।

मोबाइल इंटरनेट के इस युग में भी, पारंपरिक पुस्तकालय पूरी तरह से गायब नहीं होगा। आधुनिक पुस्तकालय पुस्तकालयों का ऐसा मिश्रण हैं जो आसानी से पारंपरिक, लाइब्रेरी 2.0 और मोबाइल के वातावरण में कार्य कर सकते हैं और उपयोगकर्ताओं की आवश्यकताओं और प्रतिक्रिया के अनुसार खुद और पुस्तकालय सेवाओं को अनुकूलित कर सकते हैं।

REFERENCES

1. Internet and Mobile Association of India. Internet in India 2013. http://www.iamai.in [Accessed on 10 December 2014]

2. Singh, Shelley. After hitting 100 million, Facebook now aims at 1 billion users in India. 2014. http://articles.economictimes.indiatimes.com/2014-04-08/news/48971129_1_access-facebook-1-billion-users-javier-olivan [Accessed on 10 December 2014]

3. Griffey, Jason. Mobile Technology & Libraries. Facet Publ., London, 2010. http://www.libsuccess.org/index.php?title=M-Libraries [Accessed on 10 December 2014]

4. Cummings, Joel; Merrill, Alex; and Borrelli, Steve. (2010). The use of handheld mobile devices: their impact and implications for library services. Library Hi Tech, 2010, 28(1), 22-40

5. http://itunes.apple.com/us/app/history-maps-of-world/id303282377 [Accessed on 11 December 2014]

6. http://itunes.apple.com/us/app/issrn/id334702612 [Accessed on 11 December 2014]

7. http://www.periodictableexplorer.com/ [Accessed on 11 December 2014]

8. http://www.oecd.org/publications/factbook [Accessed on 11 December 2014]

9. http://www.qcontinuum.org/planets/ [Accessed on 11 December 2014]

10. http://dramaresource.com/resources/software-and-apps/247-shakespeare-app [Accessed on 11 December 2014]

11. http://www.wordwebsoftware.com/WordWebiPhone.html [Accessed on 11 December 2014]

12. Brinkman, Bo (2011). Augmented Reality App for Shelf Reading. 2011. http://tinyurl.com/3kfrkta on 7.1.2014 [Accessed on 10 December 10, 2014]

13. Cao, Y., Tin, T., McGreal, R., Ally, M., & Coffey, S. The Athabasca University mobile library project: increasing the boundaries of anytime and anywhere learning for students. In Proceedings of the International conference on communications and mobile computing (IWCMC), July 3-6, 2006, Vancouver, British Columbia, 2006.

संयंत्र वर्गीकरण एवं व्यवस्था के बारे में ऑनलाइन संसाधनों की जानकारी का एक चयनात्मक अध्ययन : डिजिटल युग में उपयोगकर्ता के लिए डाटा का प्रवाह

Selective Study of Public Domain Database on Plant Taxonomy & Systematics : Data flow to the users in the Digital Age

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सारांश

प्रस्तुत लेख यंत्र वर्गीकरण के महत्त्व का वर्णन करता है और विभिन्न यंत्रों के डाटाबेस का वर्गीकरण करता है। यह संयंत्र वर्गीकरण और व्यवस्था के लिए कुछ चुनिंदा महत्त्वपूर्ण ऑनलाइन सार्वजनिक ऑनलाइन डोमेन डाटाबेस पर ध्यान केन्द्रित करने की कोशिश करता है जो यह दुनिया भर में जैव विविधता पर संयंत्र वर्गीकी वैज्ञानियों, वनस्पति वैज्ञानियों और शोधकर्ताओं के लिए डाटा प्रवाह के लिए नये रास्ते बनते जा रहे हैं।

ABSTRACT

The paper describes the importance of plant taxonomy and classifies the various plant taxonomic databases. It tries to focus on some selective important online public domain databases of plant taxonomy and systematics which are becoming a new path of data flow to the plant taxonomists, botanists and researchers on biodiversity all over the world.

Keywords: Biodiversity, databases, nomenclature, plant systematics, plant taxonomy, public domain databases

1. INTRODUCTION

Systematics is the study of biological diversity (shortened form biodiversity, E.O. Wilson) and of the evolutionary relationships among organisms[1,2,3]. By this definition taxonomy is a subdivision of systematics, consisting of three associated activities: identification (referring to a specimen to a previously classified and named group), classification (ordering organisms into groups based on perceived similarities or differences), and nomenclature (naming groups of organisms according to rules developed for the process). Systematics also includes the study of the process of evolution and phylogeny.[4]

In 1992, over 155 government leaders signed the Convention on Biological Diversity, which recognised the crucial role of taxonomy in promoting sustainable development. The value of taxonomy goes well beyond the act of identification; it has wide use and economic impact for a broad range of applications in agriculture, biodiversity conservation, protected area management, control of invasive species, forestry, plant breeding, disease control, and trade in natural products, including pharmaceuticals.[5] But there are several obstacles to progress, what the field has termed the 'taxonomic impediment'. Unlike any other scientific disciplines, the domain of systematic botany is heavily dependent on historical literature of published descriptions of genera and species; publication in print still determines the legitimacy of naming and credit for new discoveries.[6] As library is one (other being the herbarium) of the foundation of taxonomic research, and none of the libraries in the world is fully self-sufficient in its resources, therefore timely access to relevant literature can be costly, time-consuming process for all the taxonomists.[7,8]

The marriage of technology and internet finally provided a way to dissolve the taxonomic impediment, at least in part, through scanning of both the literature and specimen collections so they can be shared with global scientific community.[7] Hugh D. Wilson termed this as the "second informatics revolution"[9], which involves three basic elements: the Internet, digital transition technologies for both images and text, and web server/browser software. The internet technology provided for the first time in human history, global public access to information present at a global array of content nodes or websites.

2. WHAT IS A DATABASE?

Data in a computer has little meaning in its stored state in the physical form or logical form since any fact without the context is not usable. Database is a store of data – a collection of data, manual or computerised, held in computer files, which is generally accessible to multiple users. Databases consist of three main components: an interface, data and tools for search and retrieval.

This main aim of the paper is to study the various online sources of information in plant systematics, nomenclature and identification, which has become a new path of data flow to the taxonomists. All the databases mentioned in the paper have free access and most of them are Public domain databases (PDD). Public domain databases are databases that are freely available to all and no charges are made for the services. Anyone can contribute and can access, copy, use or contribute data to the database.[10] The web pages are cited according to NISO standards.[11]

3. CLASSIFICATION OF TAXONOMIC DATABASES

The taxonomic databases can be classified into eight major groups on the basis on their content:
3.1 Nomenclatural
3.2 Digitised botanical literature
3.3 Electronic floras or e-floras
3.4 Family-oriented databases
3.5 Image databases
3.6 Virtual herbariums
3.7 Botanical Gardens
3.8 Secondary databases

3.1 Nomenclatural Databases

Botanical nomenclature is the system of scientific naming of plants to ensure that every plant can have a name that is unambiguous and globally understood. A species becomes known in the scientific sense when a Latin binomial, a name consisting of two parts (a genus and a species), and a description are published in the scientific literature, according to the rules of International Code of Botanical Nomenclature (ICBN).

3.1.1 Algaebase Galway : National University of Ireland; c2009[cited 2012 April 12]. http://www.algaebase.org/

This is a comprehensive database on information on algae that includes terrestrial, marine and freshwater organisms. At present 130522 species and infraspecific names are in the database, 14402 images, 47629 bibliographic items and 197289 distributional records. Data can be searched by genus, species, common names, distribution, literature, glossary etc.

3.1.2 Angiosperm phylogeny website St. Louis: University of Missouri;c2008 [Cited 2012 April11]. http://www.mbot.org/M0130T/Research/ APweb/.

This website illustrates the phylogeny of angiospermic families, by which we can understand diversification, regularities in patterns of evolution within a clade. The treatments of gymnospermic groups are also added in 2005.

3.1.3 Flowering Plant Gateway Texas: Texas A & M Bioinformatics Working Group; c2000 [cited 2012 April 12]. http://botany.csdl.tamu.edu/FLORA/newgate/ cronang.htm.

The information gatekeeper of this portal is Hugh D. Wilson, Professor of Biology, Texas A&M University, Curator, Department of Biology Herbarium (TAMU) Member, Texas A&M Bioinformatics Working Group. It is a comparison of four systems of classification of flowering plants viz, Cronquist, Takhatajan, Throne and APG. The search can be made by the first letter of the family name and it also contains a vascular plant image library hyperlinked with corresponding families.

3.1.4 Index fungorum Oxfordshire: CABI; c2004 [cited 2012 April 12]. http://www.indexfungorum.org.

The names of the fungus can be searched by name or epithet. There are about 469692 records online. New records can be added by the users. Authors of fungal names can be searched by surnames and forenames. Information displayed in response to a query are taxon, author, year (current name) and parent taxon. Under author search, the record details includes citation in published list, position in classification, current name, synonymy and even there is page image of published list.

3.1.5 Index nominum supragenericorum plantarum vascularium New York : Cornell University; c2008 [cited 2012 April 12]. http://www.plantsystematics.org/reveal/pbio/ www/supragen.html.

The Index Nominum Supragenericorum Plantarum Vascularium Project is a joint effort between the International Association for Plant Taxonomy, the University of Maryland, and now Cornell University. The purpose of the project is to capture all valid and legitimate extant vascular plants names, as defined by the International Code of Botanical Nomenclature,

proposed above the rank of genus. These data are dynamic and constantly being updated. At any one time, the listing of a name means only that it is the earliest, valid place of publication found to date. Data are presented by genus, by APGII families, and by taxonomic rank. A listing of abbreviations for suprageneric names is also available.

3.1.6 Index Nominum Genericorum (ING): a compilation of generic names published for organisms covered by the ICBN Washington D.C.: Smithsonian National Museum of Natural History; c2008 [cited 2012 April 11]. http://botany.si.edu/ing/.

ING is a collaborative project of International Association for Plant Taxonomy (IAPT) and Smithsonian National Museum of Natural History was intiated in 1954. It has the facility of search for generic name, name/ basionym, type, author and family. Distributed search gives results from ING, IPNI, Index Nominum Algum and Index fungorum.

3.1.7 International Code of Botanical Nomenclature online Vienna; International Association for Plant Taxonomy; c2007 [cited 2012 April 11]. http://ibot.sav.sk/icbn/main.htm.

This is the electronic version of the original English text. It has an efficient search option also.

3.1.8 International Plant Names Index (IPNI) Kew: Royal Botanic Gardens; c2009 [cited 2012 April 11]. http://www.ipni.org/.

IPNI is the product of collaboration between The Royal Botanic Gardens, Kew, The Harvard University Herbaria, and the Australian National Herbarium. The records in IPNI come from three sources: the Index Kewensis (IK), the Gray Card Index (GCI) and the Australian Plant Names Index (APNI) The International Plant Names Index is a database of the names and associated basic bibliographical details of seed plants, ferns and fern allies. Its goal is to eliminate the need for repeated reference to primary sources for basic bibliographic information about plant names. The data are freely available and are gradually being standardized and checked. Over one million records have come from Index Kewensis, over 350,000 records from the Gray Index (originally the Gray Herbarium Card Index) which includes names for New World taxa published on or after January 1886 and over 63,000 records have come from the Australian Plant Names Index which has been compiled since 1973 and

includes all scientific names used in the literature for Australian vascular plants. Index Kewensis includes only the names of seed plants. Index Filicum, covering the ferns (and incorporating fern allies published after 1960), is now included as of 2004. The Gray Index names include vascular plants of the New World. The Australian Plant Name Index records names for all Australian plants but its contribution to IPNI is restricted to the flowering plants, the ferns and their allies. Data can be searched by plant names, authors and publications.

3.1.9 Linnaean plant name typification project London: Natural History Museum; c2009 [cited 2012 April11]. http://www.nhm.ac.uk/resaerch-curation/research/projects/linnaen typification/index. htm

Carl Linnaeus (1707-1778) introduced the consistent use of binomial names for both plants and animals, validly publishing over 9,000 plant names. Since 1981 the Linnaean Plant Name Typification Project, based at The Natural History Museum, has been collating and cataloguing information on published type designations for Linnaean plant names and, where none exists, has been collaborating with specialists in designating appropriate types. The Project is necessarily international in scope, receiving enquiries and requests for information on Linnaean names from all over the world. Based at The Natural History Museum, the Project is also indebted to the Linnaean Society of London for generous grant support.

3.1.10 Proposal sand disposals Washington D.C.: Smithsonian National Museum of Natural History; c2008 [cited 2012 April 11] http://botany.si.edu/references/codes/props/index.htm.

In 1950, the International Botanical Congress founded the International Association for Plant Taxonomy (IAPT), which initiated the journal Taxon. All proposals for conservation or rejection of scientific names are now published in Taxon. The proposal number series was started in 1954 and continues today. This is an index to the names proposed for conservation or rejection since the first proposals in 1892. The record for each name provides the citation for the relevant publications and indicates the final disposition of the proposal. The search can be made using any of the following criteria: scientific name (family, genus or species epithet) or the number of the proposal or plant group or taxonomic rank or the action proposed on the name or Taxon journal number in which the name(s) appeared (if known).

3.1.11 Taxonomic Literature II (TL-2)
Washington D.C: Smithsonian Institution;
c2010 [cited 2012 April11]
http://www.sil.si.edu/digitalcollections/tl-2/
index.cfm

This is the online version of Taxonomic Literature: A selective guide to botanical publications and collections with dates, commentaries and types (Stafleu et al.). Currently, it offers a basic database searchable by keyword, author name, title number, author name abbreviation, or title abbreviation. It also displays the search results with the scanned page and the parallel OCRed and corrected text in a "page turning" application.

3.1.12 Tropicos St.Louis : Missouri Botanical
Garden; c2009 [cited 2012 April 11].
http://www.tropicos.org/.

TROPICOS was originally created for internal research of Missouri Botanical Garden but has since been made available to the world's scientific community. All of the nomenclatural, bibliographic, and specimen data accumulated in MBG's electronic databases during the past 25 years are publicly available here. This system has over one million scientific names and 4 million specimen records. Search can be made by scientific and common names.

3.1.13 USDA-APHIS – Concordance of
angiosperm family names New York:
Cornell University; c2006 [cited 2012
April 11]
http://www.plantsystematics.org/reveal/
PB10/usda/usdaindex.html.

This is a searchable database for angiospermic family names and their alternative uses by Cronquist, Dahlgren, Reveal, Takhtajan, Throne and APGII. The nomenclature is up-to-date.

3.1.13 Vascular plant families and genera
Kew: Royal Botanic Gardens; n.d.[cited
2012 April 11].
http://data.kew.org/vpfg1992/vascplnt.htm

The data presented here are taken from the publication Vascular Plant Families and Genera compiled by R. K. Brummitt and published by the Royal Botanic Gardens, Kew in 1992. The families recognised were determined by a committee of botanists from the Royal Botanic Gardens, Kew (K) and the Natural History Museum (BM), operating between 1984 and 1992. The recognised genera are those accepted in the Kew Herbarium in 1992. Search can be made by the genus name.

3.2 Digitised botanical literature

The botanical libraries distributed all over the world hold a substantial part of the world's published knowledge on biological diversity. Yet, this wealth of knowledge is available only to those few who can gain direct access to these collections. This body of biodiversity knowledge, in its current form, is unavailable to a broad range of applications including: research, education, taxonomic study, biodiversity conservation, protected area management, disease control, and maintenance of diverse ecosystems services. Much of this published literature is rare or has limited global distribution. From a scholarly perspective, these collections are of exceptional value because the domain of systematic biology depends -- more than any other science -- upon historic literature. The "cited half-life" of natural history literature is longer than that of any other scientific domain. The so-called "decay-rate" of this literature is much slower than in other fields such as biotechnology. Mass digitization projects are taken by various important libraries to capture the significant elements of legacy taxonomic literature.

3.2.1 Biblioteca digital real jardin botanico
(=Royal Botanical Gardens) CSIC
(Consejo superior de investigaciones
cientificas = Council for Scientic
Research). Madrid: Royal Botanical
Gardens; c2009 [cited 2012 April 11].
http:// bibdigital.rjb.csic.es/ing/index.php.

The digital library of the Royal Botanic Garden Research Institute, Madrid was set up because of two factors: an extraordinary wealth of documents and active research. Royal Botanical Gardens is more than 250 years old and currently holds 1590629 pages, 2622 titles and 6128 vols. Search can be made by author, title and periodicals.

3.2.2 Biodiversity Heritage Library Washington
D.C.: Smithsonian National Museum of
Natural History; c2009 [cited 2012 April
11].
http://www.biodiversitylibrary.org/.

The Biodiversity Heritage Library (BHL) is a consortium of ten major natural history libraries and botanical libraries that cooperate to digitize and make accessible the legacy literature of biodiversity held in their collections and to make that literature available for open access and responsible use as a part of a global "biodiversity commons". The participating libraries have over two million volumes of biodiversity literature collected over 200 years to support the work of scientists, researchers, and students in their home institutions and throughout the world. BHL content may be freely viewed through the online reader or

downloaded in part or as a complete work in PDF, OCR text, or JPG2000 file formats. Publications on Gujrati & Urdu languages are available.

3.2.3 Botanicus Kew: Missouri Botanic Garden; n.d. [cited 2012 April 11] http://www.botanicus.org/.

Botanicus is a freely accessible historical botanical literature from the shelves of MBG Library. It contains 1,118 titles of books & journals, 4,969 volumes and 2,32,692 links to protologues.

3.2.4 BPH online Pittsburgh : Hunt Institute for Botanical Documentation; c2009 [cited 2012 April11]. http:// fmhibd.library.cmu.edu/fmi/inp/cgi

The abbreviations of titles of botanical journals and periodicals are searched. Apart from this, corporate entities, publication places, dates etc can also be found out by keyword search.

3.3 Electronic Floras or e-floras

The flora is time-honoured method of bringing together the essential data on what species, genera and families occur in a determined area, with an indication of how they may be recognised by means of key and descriptions, where they may be found and under what ecological conditions.12 Online floras provide research botanists with the opportunity to work on floristic treatments dynamically and enable users to browse and search these treatments.

3.3.1 e-floras St.Louis: Missouri Botanical Garden; c2009 [cited 2012 April 11]. http://www.efloras.org/index.aspx.

eFloras is a web-based programmme developed to enable access to online 'electronic floras' Through a web interface to the data, users can browse online floristic treatments by volume, family and genus, and can search by name, distributional data, and text. Taxonomic treatments can be imported and revised online with the use of web forms (Brach, 2006). Till date the printed versions of the following floras are digitized:

A Catalogue of the Vascular Plants of Madagascar, Annotated Checklist of the Flowering Plants of Nepal, Flora of Chile, Flora of China (Vols: 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 1920 22 23 24 25), Flora of Missouri, Flora of North America, Moss Flora of China (Vols: 1 2) and Trees and shrubs of the Andes of Ecuador.

3.4 Family-oriented Databases

Another approach to floristics is the development of family-oriented global master species database.

3.4.1 Carnivorous plant database s.l.: Rick Walker; c2004 [cited 2012 April 11]. http://www.omnisterra.com/bot/cp_home.cgi

Carnivorous plants are those which fulfill two requirements: (i) it must be able to absorb nutrients from dead animals juxtaposed to its surfaces, and thereby obtain some increment to fitness of terms of growth, chance of survival, pollen production, or seed set. (ii) it must have some unequivocal adaptation or resource allocation, whose primary result is the active attraction, capture and digestion of prey. Taxonomic portions of the database are compiled by Jan Schlauer and include over 3000 entries giving an exhaustive nomenclatural synopsis.

3.4.2 The Cycad pages: welcome to the intriguing world of cycads survivors from before the dinosaurs Sydney : Royal Botanic Gardens;c2004 [cited 2012 April 11] http://plantnet.rbgsyd.nsw.gov.au/PlantNet/cycad

A comprehensive, accurate and up-to-date listing of all accepted cycad names and their synonyms.

3.4.3 Gesneriaceae research Washington D.C.: Smithsonian National Museum of Natural History; c2008 [cited 2012 April 11]. http//botany.si.edu/Gesneriaceae/index.htm.

Contains world checklist of the family Gesneriaceae and annotated bibliography.

3.4.4 The Gingko pages Amsterdam: Cor Kwant; c2009 [cited 2012 April 11]. http://www.xs4all.nl/~kwanten/

Gingko biloba is a living fossil between lower and higher groups. This is a comprehensive webpage on Gingko, which has successfully completed 10 years & has won any accolades. It is one-stop information portal on Gingko, which includes taxonomic nomenclature, history, fossils, botanical description, propagation, usage, bonsai, literature and fantastic photographs.

3.4.5 The gymnosperm database [cited 2012 April 11]. http://www.conifers.org/

This is a premier source of information on conifers and their allies since 1997. Database has attracted worldwide attention as a readily accessible, scientifically accurate source of information on the classification, description, ecology and uses of this culturally and ecologically important group of plants.

3.4.6 International Legume Database & Information Services (ILDIS) Reading: Centre for Plant Diversity & Systematics, School of Plant Sciences; c2005 [cited 2012 April 11].
http://www.ildis.org/

ILDIS is an international project which aims to document and catalogue the world's legume species diversity in a readily accessible form. Under each taxon, it gives accepted name, synonyms, taxonomy, descriptions, geographical records, habitats, literature citation, sources and references. Moreover, it also directs to other important links.

3.4.7 Malvaceae info s.l.: Stewart R.Hinsley; c2009 [cited 2012 April 11].
http://www.malvaceaeinfo/

This webpage provides both botanical and horticultural information on Malvaceae and related families in the order Malvales. It contains index to vernacular names of Malvaceae by language, genus, species, and by pattern. It also contains world checklist of Malvaceae, biology, classification, digital herbarium, web directory, economic uses, photographic images and literature.

3.4.8 Neotropical blueberries : the plant family Ericaceae New York : New York Botanical Garden; c2007[cited 2012 April 11].
http://www.nybg.org/bsci/res/lut2/

This web site seeks to bring together as much information as possible about the plant family Ericaceae as it occurs within the Neotropics, which are the tropical regions of the Americas, within the Tropic of Cancer and Tropic of Capricorn (23° 30' N-23° 30'S). Currently the web site provides keys to and descriptions for the genera of neotropical Ericaceae, although not all have been published or formally treated yet in a taxonomic or revisionary sense. Along with over 550 descriptions of neotropical Ericaceae species, and relevant taxonomic information, nearly 500 species of neotropical Ericaceae are illustrated by over 1400 images. Additional information includes the concept of "rare and endangered", meaning that the species is very local in its known distribution (i.e., is known only from a few localities), has been collected fewer than 10 times overall, and that its habitat is or has been undergoing severe transformation (i.e., destruction).

3.4.9 The parasitic plant connection Carbondale: Southern Illinois University; c1997 [cited 2012 April 11].
http://www.parasiticplants.siu.edu/

This is a repository of information on parasitic plants. There are over 4,500 species of parasitic plants. Under the parasitic plant families, there are family descriptions, distribution map, list of genera, DNA sequence information, photographs and bibliographic references. Apart from this, there is links to other parasitic plant sites, names and addresses of specialists, terminology, meetings, conferences etc.

3.5 Image Databases

Images and photographs are important tools for identification of plants but all images are not botanically important.

3.5.1 An array of botanical images index New York : Cornell University; c2007[cited 2012 April 11].
http://www.plantsystematics.org/reveal/ PBIO/RevealSlides/slideindex.html.

Entries are arranged alphabetically by genus and species. Presently there are 24,800 images available.

3.5.2 Plant image collection Washington DC : Smithsonian National Museum of Natural History; c2008 [cited 2012 April 12].
http://botany.si.edu/PlantImages/

The plant images are searched by family, plant name, common name and photographs.

3.6 Virtual Herbariums

The herbarium continues to play a key role in floristics and for many is regarded as synonymous with traditional taxonomy ("herbarium taxonomy"). The essence of a herbarium is that, like other museum collections, it provides the physical vouchers of living organisms, knowledge of which is essential for our understanding, conservation and use of plant diversity[13,14,15]. Herbarium collections provide baseline data about the extent and distribution of plant diversity. They also provide a near- permanent record of taxonomic concepts and the ways in which they have changed for a particular taxon[16]. The herbarium of the future will be dramatically different and the concept of "virtual herbarium'' has already come into being. It comprises primarily an interactive web front end linked to a shared scientific names database with remote internet links to distributed specimen and other taxon or specimen-associated datasets in the herbaria[16].

3.6.1 AVH : Australia's virtual herbarium Canberra : Australian National Botanic Gardens; c2009[cited2012 April 11].
http://www.anbg.gov.au/

It provides immediate access to 6 million specimen records that are present in all the Australian herbariums.

3.6.2 Virtual herbarium
Coral Gables(Florida) : Centre for Tropical Plant Conservation; c2007[cited 2012 April 11].
http://www.virtualherbarium.org/

This is a digital version of Fairchild Tropical Botanical Garden of the Centre for Tropical Plant Conservation. It contains scanned images of herbarium sheets and label data information of about 80,000 specimens and 4,000 palms.

3.7 Botanical gardens

In the International Agenda for Botanic Gardens in Conservation the definition of a botanic garden is as follows:" Botanic gardens are institutions holding documented collections of living plants for the purposes of scientific research, conservation, display and education." [17]

3.7.1 Botanic Gardens Conservation
International: the world's greatest force for plant conservation Surrey: Botanic Gardens Conservation International (BGCI); c2007 [cited 2012 April 11].
http://www.bgci.org/

BGCI is an international organisation that exists to ensure the world-wide conservation of threatened plants, the continued existence of which are intrinsically linked to global issues including poverty, human well-being and climate change. BGCI represents over 500 members - mostly botanic gardens - in over 120 countries. It aim to support and empower their members and the wider conservation community so that their knowledge and expertise can be applied to reversing the threat of extinction crisis facing one third of all plants. It provides access to two databases viz.,

Plant Search database: Rare and threatened plant species in cultivation are located around the world. Garden Search: Over 3000 records of gardens anywhere in the world could be found. Under each entry, there are brief information about the garden, main address, contact nos., staff details, features and facilities, plant collections, conservation, research and education programmes. The data is editable by the concerned authorities for updating.

3.8 Secondary Databases

These kind of databases are secondary in nature, either functions as a directory or directs the users to the original source.

3.8.1 Botanical image databases
c2009 [cited 2012 April 11]. http://www.science.siu.edu/plantbiology/faculty/nickrent/BotImages

This is directory of botanical image databases dispered all over the world. The information is classified under General, regional and geographical based collections and plants by taxonomic groups.

3.8.2 Index herbariorum: a global directory of public herbaria and associated staff
New York: New York Botanical Garden; c2007 [cited 2012 April 12].
http://sciweb.nybg.org/science2/IndexHerbariorum.asp/

Index Herbariorum, a joint project of the International Association for Plant Taxonomy and The New York Botanical Garden (NYBG), is a detailed directory of the public herbaria of the world and the staff members associated with them. Included in the on-line edition of Index Herbariorum is information for 3,400 herbaria in 168 countries and 10,475 staff members associated with these herbaria. Information for over 80% of the herbaria has been updated, and 526 herbaria have been added. Information is available for searching by institution, city, state, acronym, staff member, correspondent, research specialty, and important collections.

3.8.3 World taxonomist database
Amsterdam: ETI Bioinformatics; c2009 [cited 2012 April 12].
http://www.eti.uva.nl/tools/wtd.php

World taxonomist database is an online directory service with continuously updated information on thousands of taxonomists/specialists worldwide. Currently there are 4799 taxonomists/specialists registered in WTD, Search can be made by person, institution, country, taxonomic group or for combination of these criteria. Taxonomists, not yet registered with WTD can register their names and those, who have already registered can update their profiles.

4.   INDIA SPECIFIC DATABASES

In India, there is neither any comprehensive database on floristic diversity   nor any nomenclatural databases describing species specific to Indian subcontinent. The only visible initiative is the development of Environmental Information System (ENVIS) established by the Ministry of Environment & Forests in 1983.18. ENVIS is a descentralised network information system consisting of the focal point in the   Ministry for co-ordinating the activities of a chain of 76 network partners (known as ENVIS centres), out of which 46

are on subject-specific and 30 are on State related issues.19 ENVIS mainly focuses on environmental information but its 4 nodes or centers deserves mention here viz,

*4.1 Envis centre on Floral diversity
Howrah : Botanical Survey of India;
c2001 [cited 2012 April12].
http://www.bsienvis.org/*

This is the only ENVIS centre for floral diversity in India. The databases contain rare and endangered plants, medicinal plants, allergic pollen, experts and RET taxa. Other information includes assessment of coastal plant diversity in India mangroves in India, wetlands. But inventory of comprehensive flora of India is lacking here.

*4.2 Envis estuaries, mangroves, coral reefs
and lagoons
Parangipettai (Tamil Nadu): Centre
of Advanced Study in Marine Biology,
Annamalai University; c2009 [cited 2012,
April 12].
http://www.casmbenvis.nic.in*

It contains a database of checklist of flowering plants and ferns in mangrove ecosystems of India, identification keys to the families, genera, systematics and also bibliographical references database.

*4.3 Medicinal plants of conservation concern
Bangalore: Foundation for Revitalization
of local health traditions (FRLHT); c2007
[cited 2012, April 12].
http://www.envisfrlht.org.in
http://www.frlht.org/newenvis/*

Online database has two parts – one that profiles 730 medicinal plants that are in all India trade and the other part a nomenclatural database of 7,637 medicinal plant species. The database can be searched by botanical, vernacular names or by the name of system of medicine. Apart from this, there is a digital herbarium for all the medicinal plants, geo-distribution maps, state wise checklist, photographs and conservation concern species. But it does not contain any botanical description and medicinal uses.

*4.3 Sahyadri: Western Ghats ecology and
biodiversity Bangalore: Centre for
Ecological Sciences, Indian Institute of
Science; c2009 [cited 2012, April12].
http://wgbis.ces.iisc.ernet.in/biodiversity/*

This is a database of flora of Western Ghats, contains 10,466 species, medicinal plants, orchids, trees and lianas, endemic tree species of Western Ghats. The information includes taxonomic hierarchy, synonymy, common name, habit, habitat, ecological status and identification key.

5. CONCLUSION

With the transition from traditional paths of data flow to the Web environment, the taxonomists, scientists and the information professionals must change their information–seeking behaviour to speed up their work. The research output and content delivery to the potential users through web will considerably decrease the time lag before expanding populations, environmental calamities, and economic development reduce the wealth of species. Regarding the quality of information content, Hugh D. Wilson points out "Systematic botany is well represented on the Web at this point and one could argue that, in terms of content and quality, the discipline is moving forward at a rate that exceeds other areas of systematic biology".9

The plant nomenclatural and taxonomic databases described in this paper are global in scope. Survey of the existing online resources reveals that there is absence of digital integrated taxonomic information system based on Indian flora. So there is an urgent need to concentrate effort to develop a national floral inventory for easy access to taxonomic information for the benefit of taxonomy, conservation and ecological sciences.

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निष्कर्ष

वेब पर्यावरण के लिए डाटा प्रवाह के परंपरागत पथों से गुजरते हुए वर्गीकी वैज्ञायनी, वैज्ञानिक और सूचना पेशेवरों को अपने काम में तेजी लाने के लिए अपने ज्ञान की मांग में परिवर्तन लाना होगा। आबादी विस्तार, पर्यावरणीय आपदाओं में संभावित उपयोगकर्ताओं को वेब के माध्यम से अनुसंधानों और सामग्री वितरण में समय की काफी बचत हुई और आर्थिक विकास ने धन के निवेश को काफी कम कर दिया। सूचना सामग्री की गुणवत्ता के बारे में क्रूग डी विलसन ने तर्क दिया,'' वेब पर व्यवस्थित वनस्पति विज्ञान का अच्छी तरह से निरूपण किया गया है और तर्क दिया जा सकता है कि सामग्री और गुणवत्ता के मामले में अनुशासन व्यवस्थति जीव विज्ञान के दूसरे क्षेत्रों की तुलना में अधिक आगे बढ़ रहा है।''

इस लेख में वर्णित वर्गीकृत डाटाबेस और संयंत्र नोमेनक्लेचर का अधिकार क्षेत्र सार्वभौमिक है। मौजूदा आनलाइन संसाधनों का सर्वेक्षण से पता चलता है कि भारतीय वनस्पति पर आधारित डिजिटल एकीकृत वगीकरण सूचना प्रणाली का अभाव है। इसलिए वर्गीकरण, संरक्षण और पारिस्थितिकी विज्ञान के लाभ के लिए वर्गीकरणीय जानकारी को सुलभ बनाने में एक राष्ट्रीय वनस्पति इनवेंटरी को विकसित करने के लिए ध्यान केन्द्रित करने के प्रयासों की तत्काल आक्ययकता है।

REFERENCES

1. Mayr, E.Principles of systematic zoology. McGraw-Hill, NewYork. 1969.
2. Simpson,G G .Principles of animal taxonomy. Columbia University Press, NewYork. 1961.
3. Wilson, E O.Time to revive systematics. Science. 1985, 230, 1227.
4. Wiston,Judith E.Describing species. Bishen Singh Mahendra Pal Singh, Dehra Dun,2002.
5. Wheeler,Q.Toward a new taxonomy. In The new taxonomy, the Systematics Association special volume series.76, edited by Quentin D.Wheeler, CRC Press, 2008, 1-18.
6. Gwinn, Nancy E. & Rinaldo, Constance. The biodiversity heritage library: sharing biodiversity literature with the world. IFLA journal. 2009,35(1),25-34.
7. Godfray, H C…et al. The web and the structure of taxonomy. Systematic biology.2007, 56(6), 943-955.
8. Minelli, A. The status of taxonomic literature. Trends in ecology and evolution, 2003, 18(2), 75-78.
9. Wilson, Hugh D. Informatics: new media and paths of data flow. Taxon, 2001, 50(2), 381-387.
10. Green, D.G. Databasing diversity-a distributed, public domain approach. Taxon, 2001, 50(2), 381-387.
11. National Information Standards Organization. Bibliographic references: an American National Standard. NISO, Maryland, 2005.
12. Heywood, V.H. Ecological data in practical taxonomy. In Taxonomy and ecology edited by V.H. Heywood, London, 1973, 329-347.
13. Boom, B M..Societal and scientific information needs from plant collections. In Sampling the green world, edited by T.F.Stuessy & S.H. Sohmer. New York, 1996, 16-27.
14. Golding, Janice S & Smith, Paul P. A 13-point flora strategy to meet conservation challenges. Taxon, 2001, 50(4), 2001, 475-477.
15. Metsger, DA & Byers, SC. Introduction. In Managing the herbarium : an interdiscplinary approach, edited by D.A. Metsger & S.C. Byers, Washington D.C.,1999,1-18.
16. Heywood,Vernon. Floristics and monography – an uncertain   future? Taxon, 2001, 50(4), 2001, 361-380.
17. BGCI. Resource centre: definition of a botanic garden.http://www.bgci.org/resources/1528 (Visited on June 3, 2009).
18. Singh,Harjit. Environmental Information System in India. DECIDOC Bulletin of Information Technology,1999,19(2), 5-12.
19. India. Ministry of Environment & Forests. Annual report 2007-2008. ENVIS,New Delhi, 2008.

ई–पुस्तकों के अधिग्रहण मॉडल : एक सिंहावलोकन
E-books Acquisition Models : An Overview

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सारांश

ई–पुस्तकें अधिक से अधिक लोगों विशेष रूप से आने वाली पीढ़ी के लिए बहुत ही सामान्य और सहज होती जा रही हैं। हालांकि सभी ई–पुस्तक प्रकाशकों अभी तक ई–पुस्तकों के प्रकाशन के लिए मानकों का पालन नहीं करती हैं फिर भी पुस्तकालयों को भी इन प्रकाशनों को लोगो तक पहुँचाने की आवश्यकता है। वर्तमान में, प्रकाशनों दोनों प्रारूपों प्रिंट और डिजिटल रूप में उपलब्ध हैं। परन्तु केवल डिजिटल प्रकाशनों में प्रचलन विभिन्न कारणों की वजह से बढ़ रहा है। पुस्तकालय बजट का उसकी कीमत के अनुरूप उपयोग किसी भी पुस्तकालयाध्यक्ष के महत्वपूर्ण कार्यों में से एक है। वर्तमान आलेख का उद्देश्य विभिन्न प्रकाषकों द्वारा इन प्रकाशनों के विभिन्न अधिग्रहण मॉडल की समीक्षा करके पुस्तकालयाध्यक्षों की सही विकल्प चुनने में मदद करना है।

ABSTRACT

E-books are becoming very common and comfortable to more and more people especially for coming generation. Though all e-book publishers do not follow the standards for e-books publication yet, libraries need to provide access to these publications also. At present, publications are available in both formats – print as well as digital. But the trend for digital only publications is growing due to various reasons. Utilizing library budget to the best of its worth is one of the key functions of a librarian. The present article aims to review various acquisition models offered by different publishers for these publications, helping librarians to make the right choice.

Keywords: E-books, acquisition models, collection development

1. INTRODUCTION

An electronic book (e-book) is a book in digital format that should be read on an electronic gadget (e-reader). E-book reading platforms have developed from standalone computers, laptops, palmtops, to exclusive e-book reader like Kindle, Smart phones like Blackberry, Treo, iPhone and iPod Touch. Recent high-end smart phones come preloaded with Blio, a free-to-download e-reader software. The study of usability and legibility of different e-reading devices by Siegenthaler, Wurtz and Groner[1] showed that the current e-reader generation is comparable to that of classic paper books. E-ink technology enabled a reading process that is very similar to the reading process of classic paper books. They concluded that in some situations, e-readers, with the option of changing font size, can have better legibility than classic paper books. The technology benefits individual readers along with libraries, writers and publishers in different ways. Everybody wants it for different reasons which pose some difficulties to others in some or the other ways. With newer generations, the demand will increase for e-versions of documents. Libraries are on the front lines of the shift to digital content. They feel a sense of urgency to improve e-book access as over a period publishing will shift to e-publishing only. Though 'open access' movement has taken place, it has not established its worth and functionality in the minds of authors and readers to a great extent. Most of the 'open access' is out of mandates. Traditional publishing will continue till the concept is accepted by all. Libraries should be purchasing e-books and e-journals.

As per Publishers Global Directory there are 68 e-book publishers in India as against 254 print book publishers[2]. About a year ago, Gargi Gupta[3] reported that India is lagging behind in adapting e-books. The main barriers are - lack of awareness about e-books, how to download them and the availability of e-reader devices. The report also states Indian market is being flooded with e-readers and e-book apps through Google Play which was launched in February 2013. In June 2013 Amazon launched its Kindle range of e-readers and the Kindle Store. Flipkart, the leading books

retailer, came out with its e-books app in August 2013 and last month, Kobo, a popular global brand of e-book readers, unveiled its range in India. This indicates Indian librarians should be prepared for the acquisition of e-books.

2. E-BOOKS ADVANTAGES

- They can be used anywhere, even while travelling. As their weight is very less compared to print books (hundreds of books in one reader of very less weight), carrying them is very convenient.
- Price of e-books is cheaper compared to printed books. Classics that are out of copyright protection offer the maximum saving in e-format.
- E-readers offer choice of fonts, font size, display preferences for number of lines per page and number of words per line. This helps the readers to choose their favourite page layout which is not possible in printed books.
- The e-ink technology used by most current e-readers is very easy on the eyes and does not strain the readers' eyes at all.
- E-books are environmentally friendlier than printed books. E-books help in reducing waste that is inherent in print books due to disposal of unsold stock.
- For borrowing e-books, patrons can search from their desks and online lending request can be attended by the library staff, thereby saving the time of the reader. The patron can register visit their device with the library to access e-books.
- E-books are very convenient to use and always available for access. They also provide online search which is very useful feature especially for research purpose.
- Today almost all libraries are facing space crunch. In such a situation, e-books have an edge over printed books as they do not require physical storage space and the maintenance efforts.

In spite of these advantages, e-books pose certain prominent challenges like:

- *Incompatibility of e-book software formats:* There are different file formats for different types of e-readers. For example, e-books bought from iBooks can't be read on a Kindle and e-books bought for the Sony Reader can't be read on the iPad or Kindle. Interoperability in the e-book file formats would give readers a seamless access to e-books through a single device. In November 2014, EPUB3[4], an international standard for digital publishing was published under the formal name ISO/IEC TS 30135 - Information technology - Digital publishing - EPUB3. If publishers follow these standards the major barrier of interoperability will get resolved.

- *Complications in lending:* For libraries, e-book collection building and making it available to patrons for use is more complicated than lending printed books. The starting price of lending e-books depends on the royalty option chosen by the author. Publishers use digital rights restrictions to limit how many times each library lends its titles. For example, Harper Collins has restricted the number of times its e-books can be loaned to just 26 because according to them unlimited lending would put increased pressure on physical bookstores, book sales and, ultimately, royalties paid to authors[5].
- *Compulsion on libraries:* Many publishers have stopped publishing journals in print form. The main reason is cost followed by physical distribution. E-publishing is gradually taking over print publishing and libraries have to procure access to them.
- *The sharing issue:* Due to the restrictions put by publishers, inter library loan service cannot be offered for ebooks.
- *Digital rights management* (i.e., antipiracy systems) is another barrier and remains a continuing concern for publishers, who are very reluctant to make content too available.
- *Difficulty in reading on screen*: Many people find it very difficult to read on screen. The feel of the paper while reading is very comforting to them.
- Pleasure of exchanging of books with friends or buying second hand copies is not possible in the e-environment.
- *Loss due to obsolescence of technology:* One can lose one's collection when an e-book format becomes obsolete or is not accessible due to Digital Rights Management tools attached to the e-books or proper backup is not taken or allowed.

Traditionally, a print book purchased for a library was owned by it. The library would keep circulating it as long as possible and replace it if it wore out. In e-book model, its ownership is more ambiguous. Librarians are grappling with this big question.

Publishers are still experimenting with how to sell e-books to libraries. Actually, many trade publishers are currently not selling e-books to libraries at all. Others are charging three times the price of a print copy for one copy of an e-book. Some insist that after an e-book is lent out for a specified number of times, the library would need to purchase another copy of that e-book.

Publishers put a lot of restrictions, not only on which e-books libraries can lend but also on the lending process. Licenses of e-books can be either limited by time period or by the number of times they are lent (i.e. after the specified time of lending, the license has

to be purchased again). Many times libraries have to pay considerably more than the individual consumers for e-book access. This disparity seems to be very confusing because the costs required for creating an e-book are much less than for physical production of a printed book. If publishers were to put such restrictions on libraries for lending of printed books, it would clearly be a violation of copyright law as they are covered by the "first-sale" doctrine. It states that once somebody buys something, they are free to do what they like with it— donate it, display it, resell it, dispose it or in the case of libraries, lend it out. As of now, this does not hold true for e-books.

The lack of available data to project usage is also a complicating factor for determining a reasonable pricing model in this developing e-book market. The concerns of authors and publishers about illegal piracy and need to protect their intellectual property have resulted in embedded Digital Rights Management (DRM), restricting e-book use. Content licenses are often leased and not purchased, depending on the policies of the vendors. Understanding the terms and conditions of e-book acquisition is very critical for establishing a cost-effective acquisition plan.

Some of the major issues that need to be considered before acquiring e-books are:

(a) Licensing and access: The details of the licensing agreement need to be checked. Does it provide multiple concurrent access, online and offline access, etc?

(b) Pricing: Are the administrative or subscription fees charged over and above the price? What happens to purchased e-books if the subscription or registration to the vendor is not renewed?

(c) Viewing format: Does the e-book format comply with international standards? Does it limit to particular devices? Is there an app to download and read e-books offline? Does it allow printing selected pages, tables or images?

(d) Intended audience: Does the program require individual user information for access? How many users can access is simultaneously? Can users browse full-text before borrowing? Is it possible to use the content on classroom projection devices such as interactive whiteboards?

(e) Does it provide interactive features like dictionary help, highlighting, writing short notes, keyword search?

(f) Usage reports: Does it generate usage report?

(g) Is it availability through aggregators?

(h) Chapter wise lending feature for circulation and course packs

(i) Does it provide full-text search across trade catalogs for selecting before purchasing?

3. E-BOOK ACQUISITION MODELS

Often, librarians are faced with either purchasing large subject collections of e-books or choosing individual titles on behalf of faculty members. Though the idea of obtaining subject collections is appealing, it presents certain challenges for libraries. Without an option to choose the titles included in the collections, libraries are left with many titles receiving little or no use. In the budget crunch state libraries choose not to purchase e-books at all. But this is not a good option. Libraries have several convenient options for building or growing their e-book collections with different acquisition models[6-11].

3.1 Ownership

Here titles purchased are owned in perpetuity just like print book. Patrons can always access the title. Flexible ownership options based on the number of simultaneous users are :

• Unlimited Users (UU) – Also called as the Concurrent Access Model (CAM). It enables libraries to buy one copy of an e-book and lend it simultaneously to multiple patrons on an unlimited concurrent access basis. Most of the times, this is the costliest option.

• Three Users (3U) – This option provides simultaneous access to a title to three patrons.

• One User (1U) – This option provides access to titles, one user at a time.

The pricing varies for each option and normally is higher for libraries than individual buyers.

3.2 Patron Driven Acquisition

Patron-driven acquisition (PDA) is a model in which a library purchases digital content (e-books, e-journals, etc.) when it is clearly indicated by a patron or patrons that they want it. In an ideal transaction, library will provide the patron with access to publishers' catalogue links, academic databases and/or library catalogs from which the patron can ask for the items. As predefined thresholds are reached for an item (e.g., number of pages read or number of requests) the library will proceed to acquire the item. The library may acquire the item permanently by purchasing, or may acquire a license to use the resource only at certain times or in certain ways. This model emphasizes procuring digital items for and of need at the moment. It does not focus for long-term collection.

There are several benefits to focusing this practice on the use of digital content: delivery is instantaneous; e-books do not require physical space, thereby reducing the specific costs for maintaining that space; libraries can easily afford to provide access to patrons while they might not be able to afford to buy those materials;

and purchases ensure usage, which is very important consideration. This model helps libraries to preserve their budget while maintaining control over the collection development process.

Three steps to set up PDA are:

1. *Build a collection* — Select titles appropriate for the interests of your patron by looking for content from a specific publisher or front list titles in a particular subject area.
2. *Expose the titles to your patrons* — Load the bibliographic records to the library catalog allowing patrons to find out titles by browsing or searching the library collection.
3. *Buy only what gets used* — A purchase is triggered when a patron:
   o Downloads an e-book title
   o Views an e-book for more than ten minutes
   o Views more than ten pages of an e-book
   o Prints, emails, or copies & pastes a portion of an e-book page

There are issues with the Patron-Driven Acquisition model like excessive restrictions, insisting to purchase item after only one access, etc. These issues can be resolved by discussing with the vendor.

3.3 Usage-Driven Acquisition (UDA)

This model is based on evidence-based decisions – you only buy what you use. This purchase model will allow libraries to purchase e-books based on actual usage. This helps libraries to develop evidence-based collection.

The model works in following steps:

1. *Deposit:* Library should deposit funds with publisher/ e-book vendor.
2. *Access:* Post a link of publisher/e-book vendor for their patrons.
3. *Use:* publisher/e-book vendor will let you know titles usage of your patrons.
4. *Own:* Your funds will be applied to purchasing only those titles that are used most.

This eliminates the risk for the library while ensuring that users always find what they need. It is a form of evidence-based collection development, with very less restrictions. Publisher / e-book vendor will provide standard COUNTER reports and will make acquisition decisions based on retrievals. Libraries may get additional usage information — such articles and search terms — if this is of interest.

3.4 Demand-driven Acquisition

Demand-driven acquisition (DDA) allows streamlining the acquisition process by matching a library's selection profile to the vendor's e-book titles. The bibliographic records of all the e-books that match the library's profile are then incorporated into the library's catalog.

The decision to purchase the title is left to the patrons. The library may set certain purchasing conditions such as a maximum price and purchasing caps so that the dedicated funds are spent according to the library's budget.

3.5 Non-Linear™ Lending

EBL (E-book Library, a ProQuest Business) offers multiple concurrent accesses through Non-Linear™ Lending. It is a system which surpasses the traditional print model of limiting access to one patron at a time. It limits the total number of lending days per year per title but enables multiple-concurrent access.

3.6 Short-Term Loans/Rental

Ebrary is the first book vendor to offer loans that are only triggered based on usage. This acquisition model provides an ideal way to support any program without any commitment to purchase. For a percentage of the cost of a one user model, library can offer access to an e-book through a short-term loan. This is a great option for libraries that need to fulfill a patron title request but do not wish to purchase the title outright. Short-term loan titles are available for a day, 7 days, 14 days or 28 days. As the loan period expire library receives a notification and is given a number of other options like purchasing the title, or make it available for purchase through Patron Driven Acquisition, or extend Short-Term Loan for more number of days. Some publishers limit libraries to 3 loans per title and then insist for its purchase. Libraries may utilize short-term loans as a standalone cost-saving service. This model can be used in combination with Patron Driven Acquisition as an additional layer of mediation before titles are triggered for purchase.

3.7 Subscription

These e-book packages are offered on an annual subscription basis with unlimited simultaneous user access at a fraction of the price. Subscription packages include a large number of titles across a broad range of subject areas, with new titles added frequently (at no additional cost). New collections are offered on an annual basis.

3.8 Consortia

In this model, member libraries of consortia purchase e-book titles at discounted price. Advantages of buying titles as a consortium member include:
• Customizing the library collection to best match their users' needs is possible.
• Libraries will actually possess a copy of purchased e-book, as in case of print copy
• Consortium offer discounted prices to all members.

3.9 Software as a Service (SAAS)

Libraries, publishers, and other organizations may license the vendor's platform to distribute their own digital items online. Eg. ebrary's SaaS is ideal for publishers who wish to distribute their own e-books, under their own brand, leveraging ebrary's flexible acquisition models and powerful research technology. It is cost-effective. It may be considered as alternative to institutional repository systems.

3.10 Online and Offline Access

In this model patrons can browse all purchased e-books and utilise full-text search within the browser. Titles can be accessed online, through vendor's PDF-based reader or by downloading Adobe Acrobat e-books to a PC, laptop or PDA for offline use.

3.11 Chapters Only

Many a times only a single chapter or few selected chapters are required by the users rather than an entire book. Purchasing the entire e-book is much costlier. This model facilitates libraries to purchase selected chapters only and then treat them like a book for lending. It can be procured for inclusion in e-package of course-material. SpringerLink is one among those that currently allow for this. , but many publishers have yet to implement search functions to this level. This is very economical to the libraries limited fund resources.

4.   CONCLUSION

Librarians need to learn how acquisitions, lending, and terms of use varies from one provider to another and how e-books could be integrated into current library functions and policies. Though e-documents are coming in play, our libraries will be hybrid in nature for some more time. We need to strike a balance between print and digital. Libraries must determine the best combination to survive its economics. It is possible to select from publishers, vendors, policies, proposals and platforms to achieve a customized acquisition suitable for individual library needs. There is a need to conduct studies to identify usage habits of library patrons to pursue more informed e-book acquisition approaches. Library professional should also insist to apply the "first-sale" doctrine to e-books.

निष्कर्ष

पुस्तकाध्यक्षों को यह सीखने की जरूरत हैं कि अधिग्रहण, उधार देना और उपयोग की शर्ते एक प्रदाता से दूसरे प्रदाता तक बदलती हैं और कैसे ई–पुस्तकों को वर्तमान पुस्तकालयो के कार्यों और नीतियों में एकीकृत किया जा सकता है । हालांकि ई–दस्तावेजों आज उपयोग हो रहे हैं हमारे पुस्तकालयों को कुछ और समय के लिए मिश्रित प्रकृति का रहना होगा। हमें प्रिंट और डिजिटल के बीच एक संतुलन कायम करने की जरूरत है। पुस्तकालयों अपनी आर्थिक स्थिति को बनाए रखने के लिए सबसे अच्छा संयोजन तय करना होगा। किसी भी व्यक्ति की पुस्तकालयों जरूरतों को पूरा करने के लिए प्रकाशकों, विक्रेताओं, नीतियों, प्रस्तावों और प्लेटफार्मों में से एक उपयुक्त स्वनिर्धारण अधिग्रहण का चयन करना संभव है। अधिक सूचनात्मक अधिग्रहण पद्धति प्राप्त करने के लिए उपभोक्ताओं की पुस्तकालय उपयोग की आदतों के बारे में अध्ययन की जरूरत हैं। पुस्तकालय पेशेवरो भी ई–पुस्तकों के "पहले–बिक्री" सिद्धांत को लागू करने के लिए जोर देना चाहिए।

REFERENCES

1. Siegenthaler, Eva; Pascal, Wurtz & Rudolf, Groner. Improving the usability of e-book readers. Journal of Usability Studies, 2010, 6(1), 25-38.
2. http://www.publishersglobal.com/directory/india/media/e-book-publishers/ [Accessed on 10 December 2014].
3. The Evolution of e-publishing: Why India has lagged behind in adapting e-books Sunday, 24 November 2013 - 7:36am IST | Place: Mumbai | Agency: DNA. http://www.dnaindia.com/lifestyle/report-the-evolution-of-e-publishing-why-india-has-lagged-behind-in-adapting-e-books-1923930 [Accessed on 10 December 2014].
4. http://www.iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=53255 [Accessed on 10 December 2014].
5. Rawlinson, Nick (2011). What are the advantages of e-book readers compared to proper books? http://www.computeractive.co.uk/ca/pc-help/2044145/advantages-e-book-readers-compared-proper-books [Accessed on 18 November 2013]
6. Models http://www.ebrary.com/corp/models.jsp [Accessed on 10 December 2014].
7. Models http://www.ebscohost.com/e-books/patron-driven-acquisition [Accessed on 10 December 2014].
8. Models http://en.wikipedia.org/wiki/patron-driven_acquisition [Accessed on 10 December 2014].
9. Models http://www.libraries.wright.edu/noshelfrequired/2013/10/30/gale-announces-new-usage-driven-acquisition-model-for-gvrl/ [Accessed on 10 December 2014].
10. Models http://www.proquest.com/libraries/academic/e-books/ebrary-EBL-Solutions-for-College-Libraries.html [Accessed on 10 December 2014].
11. Model http://www.eblib.com/?p=about [Accessed on 10 December 2014].
12. White paper on Scholarly e-books: Understanding the Return on Investment for Libraries by Kate Lara, Janet Fisher, Chris Mirakian of Publishers Communication Group, 2012.

अनुसंधान विद्वानों में ई–लर्निंग की जागरूकता : एक अध्ययन
Awareness of E-Learning Among Research Scholars : A Study

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सारांश

यह लेख जीवाजी विश्वविद्यालय, ग्वालियर के विभिन्न विषयों के अनुसंधान विद्वानों में ई–लर्निंग की जागरूकता का वर्णन करता हैं। ये विद्वान एमएलबी सरकारी कालेज आफ एकेसीलेंस, ग्वालियर में वर्ष 2014—15 में पीएचडी कार्य हेतु उपस्थित थे। कुल 49 प्रश्नावली उत्तरदाताओं से वापिस प्राप्त हुए थे। प्रमुख निष्कर्ष इस प्रकार हैं 49—उत्तरदाताओं (85.71%) 42 ने नेटवर्क कम्प्यूटर का उपयोग किया हैं। 25 उत्तरदाताओं (51.02%) ने घर पर नेटवर्क कंप्यूटर का उपयोग किया हैं। 43 (87.75%) उत्तरदाता इंटरनेट के बारे में जानते हैं 37 (75.51%) उत्तरदाताओं को पासवर्ड का ज्ञान है 36 (73.46%) चौटिंग के बारे में जागरूक हैं। जबकि केवल 9 (18.36%) और 10 (20.40%) उत्तरदाताओं को डरैग और सहायता पटल के बारे में ज्ञान हैं। हैं 39 (79.59%) उत्तरदाताओं अपनी पढ़ाई के लिए ई–मेल का उपयोग कर रहे हैं, हैं 36 (73.46%) उत्तरदाताओं डाउनलोड/अपलोड़ का, केवल 5 (10.20%) उत्तरदाताओं को बौद्धिक संपदा अधिकार (आईपीआर) के मुद्दों और 11 (22.44%) साहित्यिक चोरी के बारे में पता हैं। 35 (71.42%) उत्तरदाताओं को एनसीईआरटी और 26 (53.06%) को ज्ञान दर्शन से परिचित हैं। बडी सिफारिशे ये है: ई–लर्निंग को विश्वविद्यालयों द्वारा किए गए पाठ्यक्रमों का हिस्सा होना चाहिए शिक्षकों या पर्यवेक्षकों की ई–लर्निंग को बढावा देने में और शोध छात्रों के मनोबल को बढाने में हैं। और प्रेरणा को बढ़ावा देने में सक्रिय भागीदारी की आवश्यकता है, स्वदेशी ई–लर्निंग संसाधनों को अनुसंधान विद्वानों के लाभ के लिए बनाया जाना चाहिए। विषय जैसे–छात्रवृत्ति, अनुसंधान नैतिकता, साहित्यिक चोरी, बौद्धिक संपदा अधिकार के मुद्दे, ई–लर्निंग परियोजनाएँ आदि विश्वविद्यालयों के पीएचडी पाठ्यक्रम का हिस्सा होना चाहिए।

ABSTRACT

This article deals with the e-learning awareness among the research scholars of various disciplines of Jiwaji University, Gwalior, attending PhD coursework at M. L. B. Govt. College of Excellence, Gwalior in the session 2014-2015. Total 49 questionnaires were received back from the respondents. Major findings are: out of 49 respondents 42 (85.71%) have access to networked computer, 25 (51.02%) respondents use network computer at home, 43 (87.75%) respondents are aware of Internet, 37 (75.51%) respondents have knowledge of password, 36 (73.46%) are aware of chatting, while only 9 (18.36%) and 10 (20.40 %) respondents have knowledge about drag and help screens, 39 (79.59%) respondents are using e-mail for their studies, 36 (73.46%) respondents are aware of download/upload, only 5 (10.20%) and 11(22.44%) respondents are aware of Intellectual Property Rights (IPR) issues and plagiarism respectively, 35 (71.42%) and 26 (53.06%) respondents are familiar with programmes of NCERT and Gyan Darshan respectively. Major recommendations are: e-learning should be the part of coursework conducted by the universities, teachers' or supervisors' active participation is needed in promotion of e-learning and motivation to research scholars, indigenous e-learning resources should be created for the benefit of the research scholars. Topics such as: scholarship, research ethics, plagiarism, IPR Issues, e-learning projects, etc., should be the part of PhD course work syllabi of universities.

Keywords: Awareness, e-learning, research scholars

1. INTRODUCTION

E-learning enables a person to understand in a way, which provides a platform to learn and remember more than traditional learning. E-learning is also known by computer-based training, internet-based training, web-based training, web based instruction, computer-supported collaborative learning, technology-enhanced learning, computer –aided learning, online learning, and advanced distributed learning. These all terms are co-related and interdependent. People use these terms in various contexts interchangeably.

Information communication technologies provide a wide spectrum to have alternatives platforms to facilitate a user or group to learn in an effective and efficient way. In the learning society, e-learning is getting more and more importance due to various

benefits associated with it. Various efforts have been made to promote e-learning contents by the government agencies, NGOs and institutions. In India, e-learning can fill the gap of haves and have-nots the access to good teachers and reading materials. In the present article an attempt has been made to find out the level of e-learning awareness among the research scholars of various disciplines of Jiwaji University, Gwalior.

1.1 Definition of Important Terms

The definitions of important terms are:

Awareness is a broad term which includes knowledge, behaviour, attitudes, interests and understanding of various phenomena and it helps to act and perform in societal processes.

According to Wikipedia, "E-learning is the use of electronic educational technology in learning and teaching."

Research scholar means the person involved in higher level of intellectual or academic activities, especially conducting research for the award of PhD degree.

2. OBJECTIVES

The locale of the study is the research scholars, conducting research at Jiwaji University, Gwalior, Madhya Pradesh, India and attending PhD Coursework classes at M. L.B. Govt. College of Excellence, Gwalior in the session 2014-2015.

Present study aims to study and analyze the following:

- To know the level of awareness regarding e-tools and sources among the research scholars conducting research at Jiwaji University Gwalior
- To know about the knowledge regarding the basic applications needed in an e-environment
- To know what type of e-resources are consulted by the research scholars for their research work
- To know the familiarity regarding the institutions/ projects, which are engaged in popularizing e-learning or e-contents URL in India.

3. METHODOLOGY

The aim of present study is to record and analyze the level of awareness among research scholars in various disciplines regarding the concept of e-learning and emerging concepts of ICTs. Survey research method was applied for this study and purposive sampling method was used for this survey. A research scholar was the unit of observation for this study. Data have been collected from these selected respondents through structured questionnaire. 60 questionnaires were distributed among the research scholars of Jiwaji University Gwalior, attending PhD coursework classes

at M.L.B. Govt. College of Excellence, Gwalior and 49 research scholars responded and their responses have been analyzed in data analysis. The survey of the research scholars is conducted in the month of December 2014.

4. ANALYSIS

The results and their analysis are given in following tables:

4.1 Access to Networked Computer

Table 1 indicates that out of 49 respondents 42 (85.71%) have access to networked computer. It shows the widespread access to machines and diffusion of technology in their learning process. Only 7 (14.28%) do not have access to networked computer.

Table 1. Access to networked computer

S.No.	Items	Total	% age
1.	Yes	42	85.71
2.	No	07	14.28
	Total	49	100

4.2 Place of Using Networked Computer

The analysis of data stated in Table 2 shows that 25 (51.02%) respondents use network computer at home while 23(46.93%) go to use network computer at cafe and 10 (20.40%) and 5 (10.20) respondents use network computer at departments and libraries. The analysis of data shows that students prefer home and cafe to have access to networked computer.

Table 2. Place of using networked computer

S.No.	Items	Total	% age
1.	Department	10	20.40
2.	Home	25	51.02
3.	Cafe	23	46.93
4.	Libraries	5	10.20

4.3 Technology Awareness

The analysis of data stated in Table 3 shows that out of 49 respondents, 43 (87.75%) respondents are aware of internet and only 2(4.08%) respondents are aware of extranet and 6 (12.24%) and 5 (10.20%) respondents are aware of intranet and groupware respectively.

Table 3. Awareness of technologies

S.No.	Items	Total	% age
1.	Internet	43	87.75
2.	Intranet	6	12.24
3.	Extranet	2	4.08
4.	Groupware	5	10.20

4.4 Knowledge of Tools/Services

Collected data as tabulated in the Table 4 indicate that out of 49 respondents 37 (75.51%) respondents have knowledge of password, 36 (73.46%) respondents are aware of chatting, 32 (65.30%) and 31 (63.26%) research scholars are aware of Windows and Menu. Only 9 (18.36%) and 10 (20.40 %) respondents have knowledge about drag and help screens. Analysis of data shows that most of the students have knowledge about tools and services.

Table 4. Knowledge of tools/services

S.No.	Items	Total	% age
1.	Icon	23	46.93
2.	Menu	31	63.26
3.	Drag	9	18.36
4.	Windows	32	65.30
5.	Logon / Log off	23	46.93
6.	Username	30	61.22
7.	Password	37	75.51
8.	Help screens	10	20.40
9.	Webcams	23	46.93
10.	Blogging	12	24.48
11.	Video conferencing	30	61.22
12.	Chatting	36	73.46

4.5 Use of E-resources for Studies

Table 5 reveals that out of 49 respondents 39 (79.59%) respondents are using e-mail for their studies. It indicates that research scholars are using e-mail services for their studies as a medium for sharing the views or getting information. 32 (65.30%) respondents are consulting YouTube, 28 (57.14%) respondents are using chats, mobile texting and mobile video sharing. 4 (8.16%) respondents are using virtual learning systems for their studies and 14 (28.57%) respondents have taken benefit of blogs and digital video conferencing. Analysis of data shows that research scholars are aware

Table 5. Consultation/use of e-resources/tools for studies

S.No.	Item	Total	% age
1.	Blogs	14	28.57
2.	Chats	28	57.14
3.	Wikis	25	51.02
4.	Messenger	23	46.93
5.	E-mail	39	79.59
6.	Virtual learning systems	4	8.16
7.	Digital video conferencing	14	28.57
8.	Mobile texting	28	57.14
9.	Mobile video sharing	28	57.14
10.	YouTube	32	65.30

of the e-resources/tools but they are not consulting or taking benefit of all resources equally. Plenty of reading materials on all subjects are available on internet from various sources.

4.4 Awareness About Applications

The data in the Table 6 shows that out of 49 respondents 36 (73.46%) respondents are aware of download/upload, 25 (51.02%) respondents have knowledge of logging and 19 (38.77%) respondents are aware of basic applications. Only 5 (10.20%) and 11 (22.44%) respondents are aware of Intellectual Property Rights (IPR) issues and plagiarism respectively. IPR and plagiarism issues are concerned with the research activities.

Table 6. Awareness about applications

S.No.	Items	Total	% age
1.	Logging	25	51.02
2.	Download/upload	36	73.46
3.	Navigation	12	24.48
4.	Basic applications	19	38.77
5.	IPR Issues	5	10.20
6.	Plagiarism	11	22.44
7.	Installing	21	42.85
8.	Referencing	18	36.73

4.5 Familiarity About Popular Programs

The analysis of data in Table 7 reveals the fact that 35 (71.42%) and 26 (53.06%) respondents are familiar with programmes of NCERT and Gyan Darshan, respectively. These are the popular programs among the research scholars. 21(42.85%) are familiar with the NCTE and Gyanvani. 18 (36.73%) research scholars are aware of each UGC Infonet and ISRO- EDUSAT. Only 1 (2.04%) respondent for each of National Programme on Technology Enhanced Learning (NAPTEL) and Indian Sign Languages and Recognition System and 2 (4.08%) respondents for each of IIT, Kanpur: Brihaspati, e-pgpathshala and Consortium for Educational Communication (CEC) of have shown their familiarity. Data indicate that PhD research scholars are aware of multiple benefits of e-learning, but not exploiting these resources equally due to various reasons.

7. CONCLUSIONS
- Out of 49 respondents 42 (85.71%) have access to networked computer.
- Only 7 (14.28%) do not have access to networked computer.
- 25 (51.02%) respondents use network computer at home while 23(46.93%) are going to use network computer at cafe.

Table 7. Familiarity of institutions in popularizing e-learning/e-content

S.No.	Items	Total	% age
1.	UGC- INFONET	18	36.73
2.	Programs of NCERT	35	71.42
3.	NCTE	21	42.85
4.	IIT,Kanpur: Brihaspati	02	4.08
5.	NPTEL	01	2.04
6.	ISRO: EDUSAT	18	36.73
7.	Gyan Darshan	26	53.06
8.	Gyan Vani	21	42.85
9.	MHRDs Sakshat	04	8.16
10.	C-DAC	10	20.40
12.	E- sikshak	06	12.24
13.	Project Aakash	15	30.61
14.	e-pgpathshala	02	4.08
15.	Virtual Labs	03	6.12
16.	Talk to Teacher	07	14.28
17.	Spoken Tutorial	06	12.24
18.	CEC	02	4.08
19.	Indian Sign Languages and Recognition System	01	2.04
20.	Digital Library INFLIBNET	09	18.36

- 10 (20.40%) and 5 (10.20) respondents use network computer at departments and libraries.
- 43 (87.75%) respondents are aware of Internet and only 2(4.08%) respondent is aware of Extranet.
- 37 (75.51%) respondents have knowledge of password, 36 (73.46%) are aware for each of chatting and password, 32 (65.30%) and 31 (63.26%) research scholars are aware of Windows and Menu respectively.
- 9 (18.36%) and 10 (20.40%) respondents have knowledge about drag and help screens respectively.
- 39 (79.59%) respondents are using e- mail for their studies, 32 (65.30 %) respondents are consulting YouTube and 28 (57.14%) respondents are using chats, mobile texting and mobile video sharing.
- While 4 (8.16%) respondents are using Virtual learning systems for their studies.
- 36 (73.46%) respondents are aware of download/ upload, 25 (51.02%) respondents have knowledge of Logging and 19 (38.77%) respondents are aware of basic applications.
- Only 5 (10.20%) and 11(22.44%) respondents are aware of Intellectual Property Rights (IPR) issues and plagiarism respectively.
- 35 (71.42%) and 26 (53.06%) respondents are familiar with programmes of NCERT and Gyan Darshan respectively. 21(42.85%) are familiar with the NCTE and Gyanvani and 18 (36.73%) research scholars are aware of UGC Infonet and ISRO- EDUSAT.
- Only 1 (2.04%) respondent for each of National Programme on Technology Enhanced Learning (NAPTEL) and Indian Sign Languages and Recognition System.

SUGGESTIONS

- *E-learning should be the part of PhD research coursework*

  E-learning should be the part of coursework conducted by the universities. E-learning can boost the use of online and electronic sources. Research scholars would benefit if they are aware of various online and electronic sources. E-learning will be more useful in writing review of literature and understanding of various complex phenomena.

- *Teachers' or supervisors' active participation*

  Now library and other agencies are acquiring e-learning resources to help the research scholars in selection of problem and writing the review of literature. Research scholars must be motivated to become e-learner. This will help a lot to overcome various problems faced by research scholars. Teachers or supervisors can play a vital role in this regard.

- *Creation of e-learning resources*

  Many scholars have opted Hindi and other Indian languages as a medium for research. There are plenty of e-resources available on Internet in English language, but they do not fulfil needs of the scholars. Research scholars need information in their preferred language. Indigenous e-learning resources should be created for the benefit of the research scholars. Data indicate that research scholars are aware of multiple benefits of e-learning. It is a good sign for creating e-learning environment in academic institutions. Various e-learning content URL are available, research scholars are not fully exploiting these resources due to various reasons.

- *Upgrade the syllabi of coursework*

  Indeed various efforts have been made in India for popularizing e-learning among the research scholars. Familiarity with the efforts made by the institutions in popularizing e- learning in India among scholars is less due to various reasons. In the syllabus of course work of universities, following topics should be added to enhance and update the skill and knowledge of the research scholars:

- Scholarship
- Research ethics
- Plagiarism
- IPR Issue
- E-learning projects.

• Information literacy, etc.

Research scholars must be aware of these issues. Universities must pay attention to incorporate above mentioned topics in the syllabus of PhD coursework, so research scholars can be benefitted.

निष्कर्ष

महत्वपूर्ण निष्कर्ष नीचे बताए गए हैं–

• 49 उत्तरदाताओं में से 42 (85.71%) ने नेटवर्क कंप्यूटर का उपयोग किया है।

• केवल 7 (14.28%) ने नेटवर्क कंप्यूटर का उपयोग नहीं किया है।

• 25 (51.02%) उत्तरदाताओं घर पर नेटवर्क कंप्यूटर का उपयोग किया हैं जबकि 23 (46.93%) कैफे में नेटवर्क कंप्यूटर का उपयोग करने के लिए जा रहे हैं।

• 10 (20.40%) उत्तरदाताओं नें विभागों में और 5(10.20%) (उत्तरदाताओं ने पुस्तकालयों में नेटवर्क कंप्यूटर का उपयोग किया हैं।

• 43 (87.75%) उत्तरदाताओं को इंटरनेट के बारे में पता है और केवल 2 उत्तरदाताओं को एक्सट्रानेट के बारे में पता हैं।

• 37 (75.51%) उत्तरदाताओं को पासवर्ड के बारे में ज्ञान हैं, 36 (73.46%) को चौटिंग और पासवर्ड के बारे में ज्ञान हैं 32 (65.30%) और 31 (63.26%) शोधार्थियों को क्रमशः विडोंज और मीन्यू के बारे में पता हैं।

• 9 (18.36%) और 10 (20.40%) उत्तरदाताओं को क्रमशः डरेगिंग तथा सहायता पटल के बारे में ज्ञान हैं।

• 39 (79.59%) उत्तरदाता ई–मेल का उपयोग करते हैं 32 (65.30%) उत्तरदाताओं को यूट्यूब और 28 (57.14%) को चौटिंग, मोबाइल टेक्सट और विडीयो शेयरिंग के बारे में पता हैं।

REFERENCES

1. Clark, C.C. & Mayer R.E. e-learning and the science of instruction. Pfeiffer, San Francisco, 2008.

2. Kumbhar, Rajendra. Use of e-learning in library and information science education. DESIDOC Journal of Library and Information Technology. 2009, **29**(1), 37-41.

3. Martin, A. & Madigan D. (Eds). Digital literacies for learning. Facet Publishing, London, 2006.

4. Pradeep kumar, J.; E.I. & Panchanatham, N. A study on impact of rural college students in e-learning. Perspectives of Innovations, Economics & Business.2010, **4**(1), 98-102.

5. Sayers, Richard. Principles of awareness-raising for information literacy: a case study. UNESCO Bangkok, Bangkok, 2006. 9 p.

6. Sharma, A K. E-learning awareness among students of library and information science. In Trends and development in library and information science edited by Rishi Tiwari, P S Mukhopadhyay, B. Ramesh, G. Mahesh & Anil Singh. Zenith Publications, New Delhi, 2012. pp.447-454.

7. http://en.wikipedia.org/wiki/E-learning (Accessed on 21.12.2014).

ई–जर्नल आलेखों का संग्रह और संरक्षण हेतु डी–स्पेस साफ्टवेयर का उपयोग
Archiving and Preservation of E-Journal Articles using D-Space

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सारांश

क्रयी कटेन्ट का संरक्षण किसी भी लाइब्रेरी की प्रमुख जिम्मेदारियों में से एक है। यह आलेख एक ई–जर्नल परियोजना का वर्णन करता हैं जो देश भर में स्थापित डीआरडीओ प्रयोगशालाओं और प्रतिष्ठानों में क्रयी ई–जर्नल आलेखों को इंट्रानेट ⁄ लोकल माध्यम से पहुँचाता हैं। इस परियोजना का मूल उद्देश्य क्रयी जर्नल की प्राप्ति को बेहतर बनाना हैं और इसकी लंबी अवधि के संरक्षण को आश्वस्त करना हैं जिसके कारण डीआरडीओ द्वारा लाइसेंस के नियम और शर्तों के तहत खरीदी गई साम्रगी को लगातार प्राप्त किया जा सके। इस परियोजना के तहत ब्राउजिंग और खोजनीय सुविधा को एकल प्लेटफार्म पर प्रदान किया जा सकता हैं और भारी–भरकम आयात, उपभोक्ता इंटरफेस और मेटाडाटा के मुद्दो पर चर्चा कर रहे हैं और इन्हें हल कर रहे हैं।

ABSTRACT

Preservation of subscribed content is one of the major responsibilities of a library. This paper describes an e-Journal project to provide intranet/local access of subscribed e-journal articles to DRDO labs and establishments scattered all over the country. Basic objective of this project is to improve the access of subscribed journals holding and assurance of long-term preservation enabling continued access to materials which DRDO had paid for under license terms and conditions. Under this project browsing and searching facility is incorporated in a single platform and issues relating to bulk import, user interface and metadata have been discussed and resolved.

Keywords: Archive, E-Journal, metadata, DSpace, perpetual access, digital preservation

1. INTRODUCTION

The terms 'perpetual access', 'archiving', and 'long-term preservation' are sometimes used interchangeably. Perpetual access is most commonly associated with e-journal licence clauses designed to provide assurance of continued access to subscribed material in certain circumstances, including post-cancellation.

Archiving includss the process and procedures through which e-journal content may be regulated for short or long term periods. Long-term preservation intends to ensure the accessibility of the content for future, regardless of any technical or organisational changes. In the present context, preservation, basically "Digital Preservation", specifies to the sequence of managed activities necessary to ensure long lasting access to digital materials. Digital preservation is defined very broadly and refers to all of the actions required to maintain access to digital materials beyond the limits of media failure or technological change. According to the duration of preservation, we can divide the preservation in three basic categories which are:-

- *Long-term preservation* - Continued access to digital materials, or at least to the information contained in them, indefinitely.
- *Medium-term preservation* - Continued access to digital materials beyond changes in technology for a defined period of time but not indefinitely.
- *Short-term preservation* - Access to digital materials either for a defined period of time while use is predicted but which does not extend beyond the foreseeable future and/or until it becomes inaccessible because of changes in technology.

How to determine which one is better, in-house preservation or perpetual access, i.e., perservation by publisher at their own end?

The answer totally depends on the cost required for preservation of the contents i.e., Cost required for

- *Hardware*– like need of high-end server, redundant power supply, storage accessories support etc.
- *Software /Application* – like conversion of subscribed contents to single platform, bulk import of metadata support, front-end application for browsing and seraching of those subscribed content.

- *Manpower*–for operating and maintenance of the software/hardware, the organization should have professional manpower.

Table 1 explains the metrics required to compare the cost and reliability of in-house preservation with respect to publisher's end preservation of subscribed content.

Table 1. Metrics required for In-house preservation

S. No.	Metrics	In-house preservation	Preservation at publisher's site
1	Hardware	Y	N
2	Software	Y (may use open source software)	N (articles search/ browse using browser)
3	Professional manpower	Y	N
4	Internet	N	Y (Internet must be there to access the journal)
5	Single Platform	Y	N (Every publisher has their own platform)
6	Maintenance	Y (easy maintenance)	Y (Need Vendor/ publisher rep)
7	Cost of Perpetual access	N	Y

If an organization deals with a good number of subscribed contents with different resources, i.e., different publisher, then of course the problem of single platform cannot be resolved. Also internet facility should be there to access those journals. It is also checked whether the publisher's site is down or up if user was not able to access the journal. Since all these points become a set of questions which should be thought before making any decision regarding the preservation of resources Simultaneously, the same time, the organization needs to see whether they are able to have a good hardware/software so that they can manage the archiving facility in an effective manner. So, the organization has to check all the metrics and then it can make a good decision of whether to preserve the contents, in-house or at publisher's site.

We all know that DRDO is one of the reputed R&D organizations which requires variety of journals so that people belonging to scientific community can make good research in their respective fields. DRDO has covered 9 publishers, one service provider for 529 subscribed journals subscribed.Since all these publishers have their own platforms to search/browse the journal so DRDO itself took an initiative and made an archive application in which three publishers subscribed digital contents are incorporated successfully.

2. PROPOSED METHODS

Many questions arise when an organization thinks of developing in-house archive of their subscribed contents, some are following:-

- Whether to develop the application or use any open source software?
- Which standard is better?
- How to minimize the cost during preservation?
- How to speed up the application if Lakhs of contents have to be preserved?
- Every publisher has its own platform, then how to assemble all contents at single platform?

Today rapid development of institutional and open access repositories give you a variety of software/ resources which can be used free of cost. D-Space is one of the best software which is an open source dynamic digital repository through which an organization make a single platform for all types of publishers contents.

D-Space is a set of cooperating Java web applications and utility programs that maintains an asset store and an associated metadata store. The web applications provide interfaces for administration, deposit, ingest, search and access. The asset store is maintained on a file system or similar storage system. The metadata, including access and configuration information is stored in a relational database and supports the use of PostgreSQL and Oracle database. DSpace currently support two primary web interfaces: JSPUI which uses JSP and the Java Servlet API and XMLUI (aka Manakin based on Apache Cocoon, using XML and XSLT. DSpace holdings are made available primarily via a web interface, but it also supports the OAI-PMH v2.0, and is capable of exporting METS (Metadata Encoding and Transmission Standard) packages. DSpace supports the common interoperability standards used in the Institutional repository domain, such as Open Archives Initiative Protocol for Metadata Harvesting, SWORD, OpenSearch, and RSS.

Figure1explains how DSpace works.

Dspace was used due to following :

- Largest community of users
- Free open source software
- Completely customizable to fit our needs
- Can be installed out of the box
- Can manage and preserve all types of digital content

3. IMPLEMENTATION AND RESULTS

We started with three publisher's e-contents. The project started at the end of 2013 and till now around Eight Lakh Forty One Thousand article are successfully imported which can be browsed and searched as per user's choice criterion. The three publishers (American Chemical Society, Elsevier, and IEL Digital Library)
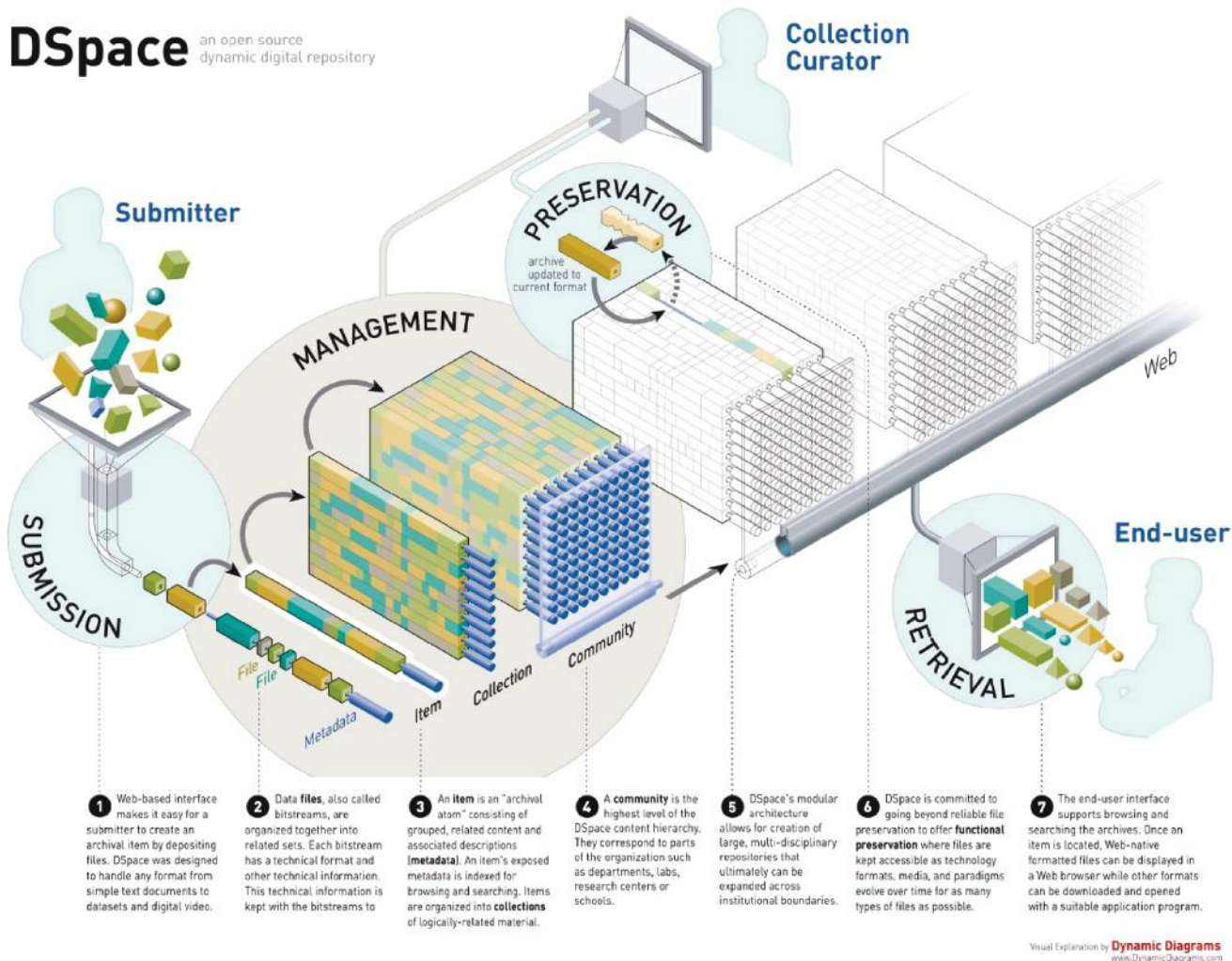
Figure 1. Working of DSpace.

are displayed in exhibited Table 2.

Table 2. Publisher-wise articles imported to DSpace

S. No.	Publisher	Total articles imported to DSpace
1	American Chemical Society (ACS) 2009-2012	1, 32, 248
2	Elsevier (Science Direct)	1, 00, 314
3	IEL Digital Library 2009-2012	2, 79, 407
4	IEL Digital Library 2013	2, 19, 448
5	IEL Digital Library (Jan-Jun) 2014	1, 09, 410

For transferring the contents of these publishers full text articles to single platform i.e. on D-Space, the java applications were made and convert each Full Text and there metadata information to Dublin core standard. These all files are then transferred as bulk import to the D-Space. There were two java applications made:-

- Java Application 1 - Crawl the publishers site to fetch and save the metadata in database

- Java Application 2 - Conversion utility program to convert the metadata to chosen standard format i.e. Dublin Core

Figure 2 is the home page of DRDO Intranet Archive of E-Journals (Consortium) service is presented in Fig. 2.

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4. USEFULNESS OF ARCHIVE

In order to evaluate how successful and effective our archive system is, usage statistics of each community was properly examined and analysed. The trends of searching through keywords and other factors are summarized in Table 3. Figure 3 shows how statistics can be viewed.

Table 3. Usage Metrics through different factors

S.No.	Analytic Metrics	Statistics
1	Community wise hits	2719
2	Collection wise hits	1396
3	Keywords wise hits	3188
4	Maximum visited article	3, 44, 857
5	Total Authorized users	24

Figure 3. Snapshot of Statistics

5. CONCLUSION

The paper observes archiving of e-contents from three publishers has been carried out in a proper manner or not. The paper further explores whether archiving was actually required, the e-contents subscribed and archived are necessary to be possessed at organisation's end or shall it be feasible to put the contents at publisher's site. Moreover, some metrics which determine to resolve whether in-house preservation or publisher site preservation is to be followed have also been discussed. The authors had also checked whether the archiving is successfully implemented and used by the end-users or not. For analysing it a number of analysis criteria are available which finally termed as Usage Statistics. Management of different e-contents to the same platform is quite difficulty but it can be done with open source software D-Space which finally resulted to be a reliable and cost-effective preservation.

निष्कर्ष

इस आलेख में हम देखते हैं कि संग्रहण हुआ हैं या नहीं। यदि संग्रहण आवश्यक है तो कटेन्ट का संग्रहण कटेन्ट ग्राहक के पास होगा या प्रकाशक स्थल पर। हम उन मापक की भी चर्चा करेंगे करेंगे जो यह निष्कर्ष निकालने में मदद करेंगे कि संग्रहण कहाँ बेहतर रहेगा? घर या प्रकाशक स्थल पर। हम यह भी जाँच करेंगे कि क्या संग्रहण सफलतापूर्वक कार्यान्वित किया गया हैं और क्या उपयोगकर्ताओं द्वारा इसे इस्तेमाल किया गया हैं? उसके लिए विश्लेषण मानदंड उपलब्ध हैं जिसे उपभोग ऑकडे कहा जाता हैं। विभिन्न ई–कंटेन्ट का एक प्लेटफार्म पर प्रबन्धन मुश्किल हैं परन्तु इसे मुक्त स्रोत साफ्टवेयर डी–स्पेस के माध्यम से किया जा सकता हैं जो एक विश्वसनीय और किफायती संग्रहण प्रदान करता हैं।

REFERENCES

1. http://www.dspace.org/
2. http://scholarlykitchen.sspnet.org/2012/03/07/e-journal-preservation-and-archiving-whether-how-who-which-where-and-when/
3. http://www.jisc.ac.uk/media/documents/publications/ejournalspreservationbp_rtf.rtf
4. http://en.wikipedia.org/wiki/DSpace
5. http://www.dpconline.org/advice/preservationhandbook/introduction/definitions-and-concepts

डी स्पेस सॉफ्टवेर : डिजिटल पुस्तकालयों के लिए संस्थागत संग्रह का एक निरीक्षण
DSpace Software: An Overview of an Institutional Repository for Digital Libraries

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सारांश

ओपन सोर्स सॉफ्टवेर जैसे ई प्रिंट्स, ग्रीनस्टोन, डीस्पेस इत्यादि डिजिटल पुस्तकालय के लिए व्यापक रूप से उपलब्ध हैं। इनमें से, डीस्पेस सॉफ्टवेर एक डिजिटल पुस्तकालय प्रणाली है जिसका रूपांकन कैपचर करने, संग्रहीत करने, क्रम–सूची बनाने, परिरक्षित रखने और एक विश्वविद्यालय के अनुसंधान विभाग के शैक्षिक आउटपुट को डिजिटल प्रारूपों में फिर से वितरित करने के लिए किया गया हैं। डी स्पेस सॉफ्टवेर एचपी लैब्स और एमआईटी पुस्तकालयों ने संयुक्त रूप से विकसित किया हैं। ये लेख डीस्पेस सिस्टम, डीस्पेस तत्व के प्रकार, पाठ्य वस्तु तथा संस्थागत संग्रह के लिए उसके उपयोग को वर्णित करता है।

ABSTRACT

Open source software like E-prints, Greenstone, DSpace, etc. are widely available for digital library. Among these, the DSpace software is a digital library system designed to capture, store, index, preserve and re-distributes the academic output of a university's research faculty in digital formats. The Dspace is developed jointly by HP labs and MIT libraries. This article describes the DSpace system, types of DSpace content and discusses the use of DSpace for institutional repository.

Keywords: Open source software, dspace, digital library, institutional repository, digital repository

1. INTRODUCTION

Digital resources are being built as self-service centres and librarians continue to play the role of information providers. Digital libraries offer such benefits as equitable access, reduced business of distance, timeliness shared resources and content delivery. To create true digital libraries, not just digital collections, will require librarians to work at closely together to create and open, distributed publicly accessible resources, as well as to establish a collaborative structure to coordinate and guide implementation.

2. OPEN SOURCE SOFTWARE

Open Source Software is computer software that is available in source code form for which the source code and certain other rights normally reserved for copyright holders are provided under a software license that permits user to study, change, and improve the software.

Open Source Software is the software usually available free of cost. It was developed by Richard Stallman's whose pioneering efforts developed the free GNU operating system. Such software is advantageous for libraries too. It allows existence of interoperability between diverse libraries, and eases data migration between systems. Three characteristics of open standards are (i) anyone can use the standards to develop software, (ii) anyone can acquire the standards for free or without a significant cost, and (iii) the standard has been developed in a way in which anyone can participate. The use of open standard can help assure interoperability of diverse systems. There are various software packages that are being used to create digital libraries.

The open source software for libraries portal (http://www.oss4lib.org), established in mid 1999, listed some of the libraries related projects that are listed in Table 1. These range from simple scripts to produce statistics to integrated library systems to institutional repository software.

3. DSpace

It is a digital library system designed to capture, store, index, preserve, and re-distribute the academic output of a university's research faculty in digital

Table 1. Types of open source software

Name	URL	Type of Project
Apache	http://www.apache.org	Web Server
Free BSD	http://www.freebasd.org	Unix Operating system
GIMP	http://www.freebasd.org	OS image manipulation Software
GNOME	http://www.gnome.org	Unix desktop environment
KDE	http://www.kde.org	Unix desktop environment
Linux	http://www.linux.org	Unix Operating system
Mozilla	http://www.mozilla.org	Web browser
My SQL	http://www.mysql.org	Database
Project Gutenberg	http://www.promo.net/pg.org	Freely available digital content (Started 1971)
Open Office	http://www.openoffice.org	Office application suite
PHP	http://www.php.net	OS programming tool
DSpace	http://www.dspace.org	Digital Library Software
Eprints	http://www.eprints.org	Digital Library Software
Greenstone	http://www.greenstone.org	Digital Library Software

formats. It is developed jointly by HP labs and MIT libraries. DSpace architecture is consists of three layer architecture namely (a) application layer, (b) business layer, (c) storage layer.

Table 2. Types of DSpace architecture descriptions

Three layer	Descriptions
Application layer	The application layer covers the interface to the systems, the web, the user, the interface and batch loader, in particular
Business layer	The business layer is where the DSpace specific functionality, workflow, content management, administration and search and browse modules happen
Storage layer	The storage layer is implemented using the file system, as managed by Postgre SQL databases

3.1 What can DSpace do?

Dspace provides long term physical storage and management of digital items in a secure, professionally, managed repository include standard operating procedures such as—backup, mirroring, refreshing media and disaster recovery. DSpace can manage and preserve all types of digital content.

DSpace software platform serves a variety of digital archiving needs. Research institutions worldwide use DSpace to meet a variety of digital archiving needs:

- Institutional Repositories
- Learning Object
- E-thesis
- Electronic Record Management
- Digital Preservation
- Publishing, etc.

3.2 DSpace Directories

A complete DSpace installation consists of three separate directory trees. It is important to get a general understanding of the DSpace directories and the names by which they are generally referred.

DSpace directories

Installation directory   **Source directory**   **Web development directory**
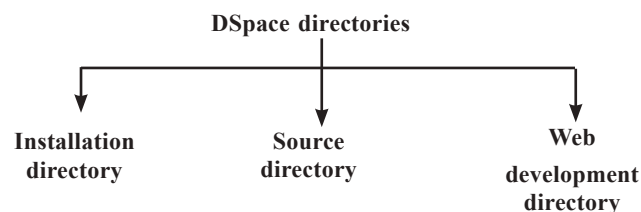
Installation directory, referred to as (DSpace), this is the location where DSpace is installed and run. It is the location that gets defined in the dspace.cfg as 'dspace.dir'. It is where all the DSpace configuration files, command line scripts, documentation and webapps will be installed to.

Source directory, referred to as (DSpace-source). This is the location where the DSpace release distribution is unzipped. It usually has the name of the archive that is expanded by the user such as dspace-<version>-release or dspace-<version>-src-release. It is the directory where all 'build' commands are run.

Web development directory: This is the directory that contains DSpace web application(s). In DSpace1.5.x and above, this corresponds to (dspace)/weballs by default. However, if you are using Tomcat, you may decide to copy your DSpace web applications from (dspace)/webapps/ to (tomcat)/webapps/ (with (tomcat) being wherever your installed Tomcat- also known as $CATALINA_HOME).

4. INSTITUTIONAL REPOSITORY

Institutional repository is a computerized system that systematically collects, digitizes, preserves and

disseminates the intellectual output in digital form. The institutional repository is collecting, digitizing, organizing information generated by the laboratories across India in the form of various types of R&D reports.

We can store all types of content in a Dspace, such as

- *Academic publications:* articles (published articles in journals, magazines and newspapers, copyright approved post- print articles, pre- print materials related to published peer- reviewed articles), books, (including conference proceedings, and abstracts).

  Theses and dissertations: Doctoral theses, Masters Theses, and dissertations.
- *Grey literature:* Patents (published only), technical reports, software, project reports, internet, publication, documentation and manuals, working and discussion papers, non peer- reviewed, conference and workshop materials (posters and speech/ lecture materials)
- *Audio-visual items:* images, shows/ exhibitions, lecture, etc.
- What training does the librarian need for this? Librarian must be well- equipped with handling the latest software available pertaining to his / her discipline.
- How is the system foolproof?

  In Dspace all the passwords are encrypted. There are no other access restrictions which can be implemented in Dspace. The database in DSpace is stored in postgresql where postgresql has username and password Dspace database. The details of each users logging is saved in Dspace.cfg file. End user cannot get access to database schema unless he has login and password of PostgreSQL database. Only system administration can access database schema.

5. BENEFITS OF USING DSpace IN DIGITAL LIBRARY

There are many benefits of a digital Library:

- The visibility of the academic output of an Institute will be increased.
- A repository enables the institute to publish its own scientific research and to make it available to all of its researchers.
- Preserves and provide long- term access to the scholars research output.
- Make possible easy access to electronic theses & dissertations (ETD). However only print version of theses, dissertations were available a few years back.
- It can be accessed 24 hours a day by just only login user name and password which is given by the library.

- More than one person can access a particular document at the same time
- Provides new opportunities for archiving and preservation of valuable digital works.
- Reduces duplication of records.
- Provides a global platform for the local research, and hence, improved visibility.

6. CONCLUSION

Library is the heart of any institute or organization. Digital libraries are very important platform of structured well- organized and well – stored information. Library is a non-profit organization.

DSpace is open source digital library software that provides facility to organize all types of content in digital format. It provide access facility for a particular document in a different way like, Author search, Title search, Subject search, and date of submission.

The aim of DSpace at MIT, and at a growing number of other institutions, is to create research material in many forms visibly available. Though beneficial, DSpace is still not being used in many libraries. It still needs considerable efforts to find incentives for faculty to participate and work with publishers and government regulators to ensure that software like DSpace continue to be allowed. A step forward in this direction would be to get more institutions involved to work together.

निष्कर्ष

पुस्तकालय किसी भी संस्थान या संगठन का हृदय है। डिजिटल पुस्तकालय संरचित सुव्यवस्थित और सुसंग्रहित जानकारी का बहुत महत्वपूर्ण मंच हैं। पुस्तकालय एक गैर–लाभकारी संगठन है। डीस्पेस ओपन सोर्स डिजिटल लाइब्रेरी सॉफ्टवेयर है जो कि डिजिटल फारमेट मे सभी प्रकार की सामग्री को व्यवस्थित करने की सुविधा प्रदान करता है। यह एक अलग तरह से एक विशेष दस्तावेज के उपयोग की सुविधा प्रदान करता है जैसे, लेखक खोज, शीर्षक खोज, विषय खोज और जमा करने की तारीख।

एमआईटी में, और अन्य संस्थानों की बढ़ती संख्या में डीस्पेस का उद्देश्य, प्रत्यक्ष तौर पर उपलब्ध शोध सामग्री को कई रूपों में बनाने को लेकर हैं। हालांकि लाभदायी है, डीस्पेस अभी भी कई पुस्तकालयों में इस्तेमाल नहीं किया जा रहा है। यहाँ अभी भी विभाग को भागीदार बनाने के लिए प्रोत्साहित करने और प्रकाशकों और सरकारी नियामकों के साथ काम करने की काफी आवश्यकता हैं ताकि डीस्पेस जैसे सॉफ्टवेर को जारी रखने की अनुमति दी जाए। इस दिशा में रखा गया एक कदम अधिक संस्थानो की एक साथ मिलकर काम करने की सोच को आगे लाएगा।

REFERENCES
1. Arms, W.Y. Digital libraries. New York: MIT Press, 2003

2. Borgman, C.L. What are Digiting Libraries? Competing Visions. Information Processing and Management, 1999, **35**(3), pp.227-243.

3. Trolley, J.H. Digital. Library Partnership: the issues and challenges. 1997, **31**(1/2), pp.221-226.

4. Dspace : Retrieved From : http://www.dspace.org/

5. Krishnamurthy M. Digital Library of Mathematics using DSPACE. A practical experience. *SRELS J. Info. Manag.,* 2005, **42**(3), pp.245-256.

वैश्विक संदर्भ में ओपन एक्सेस रिपोजिटरीज
Open Access Repositories In Global Context

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सारांश

वर्तमान अध्ययन वैश्विक संदर्भ में ओपन एक्सेस रिपोजिटरीज (ओएआर) से संबंधित है। इस पत्र में ओपन एक्सेस रिपोजिटरीज की डायरेक्टरी में पंजीकृत ओएआर के विश्वव्यापी विकास और प्रगति पर चर्चा की गई है। प्रयुक्त सॉफ्टवेयर, सामग्रियों के प्रकार, प्रयुक्त भाषा, देश का प्रतिनिधित्व, रिपोजिटरी नीतियां इत्यादि जैसे पहलुओं पर ओएआर का आकलन करने के लिए विचार किया गया है। आंकड़ों के वैधकरण के लिए ओपनडीओएआर के साथ पंजीकृत विभिन्न ओएआर का दौरा करके सर्वेक्षण किया गया है। अध्ययन दर्शाता है कि विश्वभर में आज तक कुल मिलाकर 2613 ओएआर पंजीकृत हैं जिनमें से 1205 रिपोजिटरीज यूरोप से हैं। एक अकेले देश के प्रतिनिधित्व की दृष्टि से यूनाइटेड स्टेट्स अत्यधिक संख्या में रिपोजिटरीज का प्रतिनिधित्व करता है। यह पत्र विश्व के विभिन्न भागों में अब तक विकसित ओएआर के विभिन्न पहलुओं को तलाशता है और निष्कर्षों को उजागर करता है।

ABSTRACT

Present study is primarily concerned with the open access repositories (OARs) in universal context. The paper discusses the worldwide growth and development of the OARs, registered with directory of open access repositories. The aspects like software used, types of materials, language used, country representation, repository policies etc. have been considered to assess the OARs. Survey by visiting various OARs registered with OpenDOAR has been made for validation of the data. The study shows that there are in all 2613 OARs registered till date in the world, out of which 1205 repositories are from the Europe. Unites States represent the highest number of repositories as an individual country representation. This paper explores different aspects of OARs, developed so far in different parts of the world and reveals the findings.

Keywords: Open access repository, DOAR, ICT, DSpace, e-prints, metadata

1. INTRODUCTION

The emergence of Information and Communication Technologies (ICT) has accelerated and offers great opportunities to fast, cost effective and efficient electronic communication of information. Open Access Repositories (OARs) are the ventures of ICT which have given boon to the open access initiatives. OARs are those repositories which are being made open to make the content accessible to the user group of a particular organisation or at a global level. Budapest Open Access Initiative (2002) defined the concept of open access in relation to journal literature as, "free availability on the public internet, permitting any user to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. The only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited. Different types of repositories are found such as institutional repositories,publisher's repositories, dataset repositories, learning object repositories, cultural heritage repositories, government repositories and disciplinary repositories etc. Crow (2002) defined IR as "digital collections capturing and preserving the intellectual output of a single or multi-university community". IR is a platform through which any organisation can publish their intellectual output, preserve them for

lifelong use and disseminate them among the interested users free of cost. Large number of academic and research institutions across the globe are building up own institutional repository centres for managing their research outputs.

2. REVIEW OF LITERATURE

Some of the important literatures found relevant to the present study are as follows:

Banks (2006) argued that Open Access Repositories represented an exciting possibility for both the preservation and retrieval of grey literature. Ghosh and Das (2006) stated that the concept of open access came during 1991 due to the necessity of facilitating scientific scholarly communication. Wani, Gul& Rah (2009) threw light on the growth and development of open access repositories throughout the world.

The study further emphasizes deeply into the Asian contributions and brought to light detailed profiles of Asia. Bhat (2010) defines Open access repositories as a way of furthering the cause of open access to scholarship.Krishnamurthy and Kemparaju (2011) reported a study of Institutional Repositories in use in Indian universities and research institutes. They studied 20 repositories which covered collections of diverse types.

Most of the IRs investigated operate on a UNIX/ Linux operating system platform.Roy, Mukhopadhay, and Biswas (2011) showed that growth of the OARs is highest (18.33%) in 2009 in India and DSpace was the most favourite software among the Indian OARs for managing digital documents.

Alma (2011) mentioned the following as the benefits that repositories bring to institutions: opens up the outputs of the university to the world; maximizes the visibility and impact of these outputs as a result; showcases the university to interested constituencies such as potential staff, potential students and other stakeholders; manages and measures research and teaching activities and so on.

Jan and Khan (2012) witnessed that most of the disciplinary repositories were created in the fields like History and Archeology, Geography and Regional studies with least emphasis on rapidly growing field of Science and Technology. They also found that US was playing the leading role in creating disciplinary repositories with 53% contribution.

Nazim and Mukherjee (2011) mentioned that in Asia, Institutional based IRs are highest (93.24%). Sengupta (2012) in his study entitled found that more than 2600 repositories are there in the world and out of which 247 repositories were archiving electronic thesis and dissertation. Twenty five ETD repositions were from India.

3. OBJECTIVES OF THE STUDY

The main objectives of the present study are listed below:
- To identify the year wise growth of the open access repositories worldwide
- To understand continent and country wise distribution of OARs
- To identify the widely used open access repository software
- To ascertain the type of the contents included by the repositories
- To know the most preferred language used for the repositories
- To find out the use status of the OARs policy among the repositories.

4. METHODOLOGY

For the present study, survey of the various Open Access Repositories registered with OpenDOAR has been made during the period from January to March 2014. The sites of some important OARs have also been visited to understand their policies and different features.

5. SCOPE AND LIMITATIONS

The present study has been delimited with the Open Access Repositories (OARs) which are registered with Directory of Open Access Repositories (DOAR). Open DOAR is the most widely used and conventional directory in the present time for Open Access Repositories.

The limitation of the study lies in the fact that although a large number of repositories have been developed so far around the world but still a good number of repositories present have not been registered with OpenDOAR, so it was not possible to find out such repositories and that's why such repositories were excluded from the present study.

6. MAJOR FINDINGS

Major findings of the present study are listed below:

6.1 Growth of Open Access Repositories-worldwide

Table 1 shows that growth of OARs varies year wise in between 2005-2013. Growth of OARs is highest in 2006 and 2012 shows the lowest growth. In 2006, a total of 592 repositories have been added. This result reveals that growth of Open Access Repositories is not similar with the growth of time.

6.2 Geographical Scattering of Repositories

The study shows that all the continents are maintaining Open Access Repositories for managing their digital documents, but among them major shareholders is

Table 1. Growth of open access repositories-worldwide during 2005 – 2013

Year	Number of OARs added
2013	312
2012	103
2011	264
2010	329
2009	207
2008	293
2007	206
2006	592
2005	182

Europe, which contributes 1205 (46.2%) repositories followed by North America with 526 repositories (20.1%). Asia appears as the third largest contributor with 462 (17.7%) repositories and South America ranks fourth with 233 repositories (8.9%). It is found that in comparison to developed country, developing countries are still lagging behind in creating Open Access Repositories. (Table-2).

Table 1. Growth of open access repositories-worldwide.

Continent	Number of Repositories	Percentage (%)
Europe	1205	46.1
North America	526	20.1
Asia	462	17.7
South America	233	8.9
Africa	96	3.7
Australasia	59	2.3
Caribbean	16	0.6
Central America	12	0.4
Oceania	03	0.1
Others	01	0.03
Total	2613	100

6.3 Country's representations in OAR's

Study reveals that the United States has the highest number with total of 439 repositories (16.8%), followed by the United Kingdom 221(8.5%) and Germany with 169(6.5%). In the continent Asia, Japan leads with 144 repositories (5.5%) and ranks 4th at the worldwide. India, one of the major countries of Asia ranks tenth with 70 repositories. Besides all these, there are 1132 nos. of repositories from rest of the countries. (Table 3).

6.4 Content types

The developers of the Open Access Repositories manage the repository contents by type such as journal articles, theses and dissertations, multimedia etc. Study

Table 3. Country-wise proportions of repositories

Rank	Country	No. of Repositories	Percentage (%)
1	United States	439	16.8
2	United Kingdom	221	8.5
3	Germany	169	6.5
4	Japan	144	5.5
5	Spain	111	4.2
6	Poland	85	3.3
7	France	84	3.2
8	Brazil	83	3.2
9	Italy	75	2.9
10	India	70	2.7
	Others	1132	43.3
	Total	2613	100

shows that a large number of Open Access Repositories (OARs) have more than one content type. Table 4 shows a clear picture of the content types of the OARs of world. The data shows a total of 1777 repositories preserve journal articles which is highest followed by theses and dissertations (1425), book chapter and sections (953) and content type software is the least, with 38 nos. of repositories. (Table 4).

Table 4. Content type-wise open access repositories

Content Type	No. of Repositories	Percentage (%)
Journal articles	1777	68.0
Theses and dissertations	1425	54.5
Book, chapters and sections	953	36.4
Unpublished reports and working papers	945	36.1
Conference and workshop papers	907	34.7
Multimedia and audio-visual materials	626	23.9
Other special item types	459	17.5
Bibliographic references	431	16.4
Learning objects	423	16.1
Datasets	108	4.13
Patients	81	3.09
Software	38	1.45

6.5 Repository type

The study reveals that most of the repositories are institution based. A total of 2160 (82.6%) repositories were created by an institution or a department. Only 74 (2.8%) repositories have been created for managing the governmental data, which is the least. Table 5 gives a clear understanding of the result.

Table 5. Repository type-wise of open access repositories

Repository Type	No. of repositories	Percentage (%)
Institutional	2160	82.6
Disciplinary	283	10.8
Aggregating	96	3.7
Governmental	74	2.8
Total	2613	100

6.6 Software usage

A large number of open source software's are available on the web for creating the OARs. DSpace Open source software created by MIT Libraries and HP labs is the widely used repository software among all those. A total of 1095 (41.8%) OARs are running

Table 6. Software usage of open access repositories

Software	No. of repositories	Percentage (%)
DSpace	1095	41.9
EPrint	371	14.1
Unknown	281	10.7
Digital Commons	120	4.5
OPUS	71	2.7
dLibra	60	2.3
Greenstone	55	2.1
CONTENTdm	48	1.8
Others	512	19.5
Total	2613	100

on this platform. Table 6 presents the results.

6.7 Language variety

Figure 5 shows that out of 2613 repositories, English language has been used by 1853 (70%) repositories as it is an International language, followed by Spanish, German, French, Japanese, Portuguese, Chinese, Polish and Italian with 334(12%), 209(7%), 165(6%), 145(5%), 139(5%), 109(4%), 85(3%) and 78(2%) repositories respectively. There are around 31 languages which are represented by 1 to 3 repositories. Few repositories have been using regional Indian languages like Hindi, Sanskrit, Marathi, Bengali etc.

6.8 Subject wise OARs

Due to Information explosion, universe of knowledge has been divided in to many subjects. So Open Access Repositories are also archiving multidisciplinary subjects into their repository. Study shows that multidisciplinary repositories are highest in number 1553(59%), followed by health and medicine 251(9%), history and archaeology 212(8%), Business and Economics 203(7%), Law and Politics 194(7%) and so on. It is clear from the present study that in most of the cases one repository
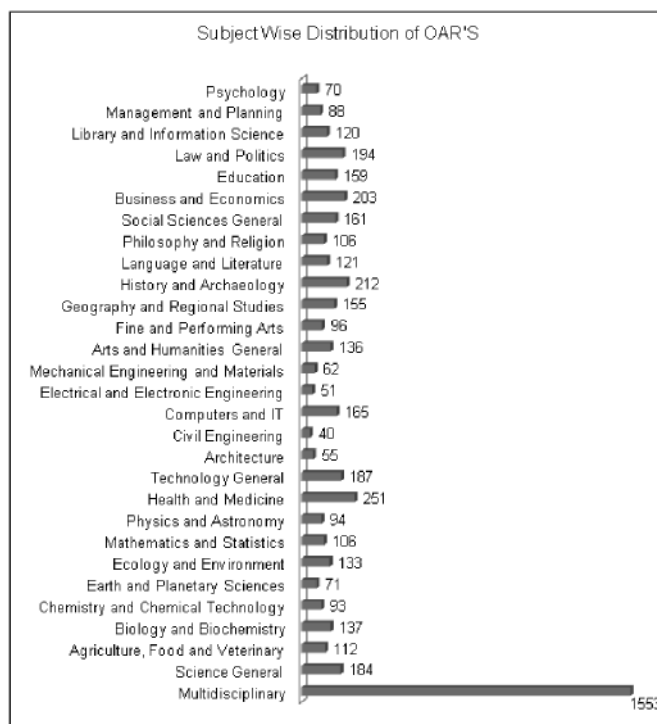
Figure 5. Subject wise open access repositories-worldwide.

archives more than one subject. Figure 5 gives detailed result of subject wise repositories registered with OpenDOAR.

6.9 Open access repository policy

Study shows that although there are 2613 repositories registered with OpenDOAR but only 2312 repositories have been analysed on policy issue. Five key policies have been identified by OpenDOAR (i.e. submission, preservation, content, metadata and data reuse policy).

6.9.1 Metadata re-use policies –worldwide

Table 7 shows that 1830 (79.1%) of repositories have not defined Metadata re-use policies for their repositories. 200(8.7%) repositories have permitted Metadata re-use for not-for-profit purposes and 115 (5.0%) repositories for commercial purposes.

6.9.2 Preservation policies - worldwide

Table 8 shows that maximum numbers of repositories do not have any preservation policy. Only 186 numbers (8.0%) of repositories have defined preservation policy.

6.9.3 Content policies - worldwide

Table 9 represents that a majority of the repositories i.e., 1755 nos. have undefined policy. Only 398 repositories have their defined policy on content of the repository. This shows that majority of the repositories are not fully concerned about their repository content

Table 7. Metadata re-use policies–worldwide

Metadata re-use policy	No. of Repositories	Percentage (%)
Undefined	1830	79.1
Non-profit	200	8.7
Unknown	116	5.1
Commercial	115	5.0
Unstated	46	2.0
No Rights	03	0.1
Unclear	02	0.0

Table 8. Preservation policies-worldwide

Preservation policies	No of Repositories	Percentage (%)
Undefined	1495	64.6
Unstated	510	22.1
Defined	186	8.0
Unknown	116	5.1
Unclear	05	0.2

Table 9. Content policies-worldwide

Content policies	No of Repositories	Percentage (%)
Undefined	1760	76.1
Defined	398	17.2
Unknown	111	4.8
Unstated	43	1.9

policy.

6.9.4 Submission policies - worldwide

An Open Access Repository should have a clearly defined submission policy for archiving their digital documents but the data collected from OpenDOAR shows that only 425 (18.4%) nos. of repositories have defined submission policy and the rest have either undefined, unknown or unstated submission policy.

Table 10. Submission policies-worldwide

Submission policies	No of Repositories	Percentage (%)
Undefined	1722	74.5
Defined	425	18.4
Unknown	120	5.2
Unstated	43	1.9
Unclear	02	0.0

Table 10 shows the result.

6.9.5 Full-text data re-use policies – worldwide

Table 11 displays the results of full-text data re-use policy. It represents that 1766 nos. of repositories have undefined, 177 have Non-Profit, 108 have unknown,

Table 11. Full-text data re-use policies – worldwide

Full text data re use policies	No of Repositories	Percentage (%)
Undefined	1766	76.4
Non Profit	177	7.6
Unknown	108	4.8
No Robots	101	4.4
Variable	93	4.0
Unstated	45	2.0
No Rights	07	0.3
Unclear	05	0.2
Others	08	0.3

101 No-Robots, 93 Variable and 45 have Unstated Full-text data re-use policy. It shows that majority of the repositories don't have Full-text data re-use policy.

7. CONCLUSION

Open Access Repositories are playing an important role in academic and research institutions, where intellectual/cultural outputs are being archived. OARs are now undoubtedly recognized as an essential component to answer the higher education challenges in the digital world. Due to the fund constraints and the high price of the scholarly research publications, importance of creating the OARs is highly solicited. OARs are very important for the developing countries like India where fund is a major constrain to satisfy the ever increasing information need of the user's community. It is one of the best possibilities which can be utilised by each and every institution to make their research output widely available and accessible to interested users throughout the world. Open access repositories are giving boon to the open access movement. Present study gives a clear status of the open access repositories of the world and the study shows that developed countries are very much concerned with OARs in comparison to developing countries.

निष्कर्ष

ओपन एक्सेस रिपोजटिरीज शैक्षणिक और अनुसंधान संस्थाओं में एक महत्वपूर्ण भूमिका निभा रही हैं, जहां बौद्धिकध्सांस्कृतिक परिणामों को अभिलेखबद्ध किया जा रहा है। ओएआर को अब निःसंदेह डिजिटल विश्व में मौजूद उच्चतर शिक्षा चुनौतियों का उत्तर देने के लिए एक आवश्यक घटक के रूप में माना जाता है। निधिगत सीमाओं और अध्येता अनुसंधान प्रकाशनों की उच्च कीमत के कारण ओएआर के सृजन के महत्व को अत्यधिक स्वीकार किया जाता है। भारत जैसे विकासशील देशों के लिए ओएआर बहुत महत्वपूर्ण हैं जहां निधि उपयोगकर्ता समुदाय की बढ़ती सूचना संबंधी जरूरतों को पूरा करने में एक बड़ी बाधा है। यह उन उत्तम

संभावनाओं में से एक है जिसे प्रत्येक संस्था द्वारा अपने अनुसंधान परिणामों को विश्वभर में दिलचस्पी रखने वाले प्रयोक्ताओं को व्यापक रूप से उपलब्ध कराने के लिए उपयोग करना चाहिए। ओपन एक्सेस रिपोजिटरीज खुली पहुंच आंदोलन के लिए वरदान साबित हो रही हैं। वर्तमान अध्ययन विश्वभर की ओपन एक्सेस रिपोजिटरीज की स्पष्ट स्थिति बताता है और अध्ययन दर्शाता है कि विकासशील देशों की तुलना में विकसित देश ओएआर से अत्यधिक संबंधित है।

REFERENCES

1. Banks, M.A. Towards a continuum of scholarship: The eventual collapse of the distinction between grey and non-grey literature. Publishing Research Quarterly, 2006, 22(1), http://eprints.rclis.org/archive/00005803/01/GL7Paper_Final.pdf

2. Bhat, Mohammad Hanief. Open Access Repositories: A Review. Library Philosophy and Practice, 2010. http://unllib.unl.edu/LPP/hanief2.htm

3. Budapest Open Access Initiative, 2002. http://www.soros.org/openaccess

4. Crow, Raymond. The case for institutional repositories: a SPARC position paper, Washington, DC: Association of Research Libraries, 2002 http://www.arl.org/sparc/IR/ir.html

5. Ghosh, S. B. and Das, Anup Kumar. Open access and institutional repositories- a developing country perspective: a case study of India. IFLA Journal, 2007, 33(3), 229–250.

6. Jan, Rosy &Khan NadimAkhtar. Development of disciplinary repositories: A case study of Open DOAR. 2010. http://ir.inflibnet.ac.in

7. Krishnamurthy, M., &Kemparaju, T.D. Institutional repositories in Indian universities and research institutes: A study. Program: electronic library and information systems, 2011, 45, 185-190. doi: 10.1108/00330331111129723

8. Nazim, Mohammad & Mukherjee, Bhaskar. Status of institutional repositories in Asian countries. Library Philosophy and Practice, 2011. http://www.webpages.uidaho.edu/~mbolin/nazim-mukherjee.htm

9. Roy, Bijan Kumar, Mukhopadhyay, Parthasarathi&Biswas, Subal Chandra. An analytical study of institutional digital repositories in India. Library Philosophy and Practice, 2012. http://www.webpages.uidaho.edu/~mbolin/roy-mukhopadhyay-biswas.htm

10. Sengupta, Santashree. Status of e-theses repositories with special reference to India. Library Philosophy and Practice, 2012. http://www.webpages.uidaho.edu/~mbolin/sengupta.htm

11. Swan, Alma. Open Access for Indian Scholarship. DESIDOC Journal of Library and Information Technology, 2008, 28(1), 15-24.

12. The Directory of Open Access Repositories – OpenDOAR. http://www.opendoar.org/

13. Wani, Z.A., Gul, S., & Rah, J.A. Open access repositories: A global perspective with an emphasis on Asia. Chinese Librarianship: an International Electronic Journal, 2009, 27. http://www.iclc.us/cliej/cl27WGR.htm

ई–पुस्तक को उधार पर देना – प्रथा और चुनौतियों
E-Book lending – Practices and Challenges

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सारांश

इंटरनेट और स्मार्ट फोन और टैबलेट के बढ़ते प्रभाव के साथ, ई–कॉमर्स और ई–पुस्तकों के रूप में इलैक्ट्रॉनिक डाटा का भी विस्तार में हो रहा है। ई–पुस्तकों के विस्तार के साथ ई–पुस्तकों को उधार देने का प्रचलन मुद्रित किताब के उधार देने के तर्ज पर गति प्राप्त कर रहा है। यह आलेख विभिन्न विधियों के माध्यम से ई–पुस्तकों को उधार देने पर नजर डालता हैं और इसके लिए नए तरीके भी बदलाता हैं और ई–पुस्तकों को उधार देने से जुडी हुई विभिन्न चुनौतियों का भी विश्लेषण करता हैं।

ABSTRACT

Growing coverage of internet and smart phones and tablets, has been accompanied with the growth of electronic data in forms of e-commerce and e-books. With the growth of e-books, the trend of lending e-books is gaining momentum on the same lines of printed book lending. This paper intends to look at the various method of e-book lending today as well tries to suggest a new method for the same and also analyzes the various challenges faced today regarding e-book lending.

Keywords: e-books, digital books, HOOPLA, amazon, e-resources

1. INTRODUCTION

Today internet and smart mobile devices are growing and reaching every nook and corner of the world and with them growing is the e-resources. E-books today have grown tremendously and as more of smart devices come in people's hands, it is expected to grow, as mentioned in the report[1] :

As the innovation curve reaches its later stages, an innovation often becomes accepted as a natural component of the industry's business environment rather than an exception. Considerable evidence suggests that

Figure 1. E-book growth among people.

e-books and other digital content products are now well established product categories that offer consumers a broader range of reading options, resulting in an overall increase in reading activity.

With this tremendous growth, another aspect of books that have become common place is lending or sharing of e-books. Since each book is given to user in a digital format, it becomes very easy for the user to just copy and paste that file which in turn is re-distribution of the book, and hence, leads to piracy. Hence need for a framework to exchange as well as lend e-books needs to build upon.

The problem undertaken here is universal solution for e-book lending. As stated earlier, there is no fixed solution or lending of e-book in a way that is beneficial to the consumers as well as libraries, and also for the publishers and authors. Some of the leading industrial solutions for the problem are stated.

2. PRESENT SITUATION
2.1 Case Study: Overdrive[6]

Overdrive is one of the largest e-book lending service around the globe with lending over 1.8 million e-books. Overdrive acts as service to various brick and mortar libraries. They have a variety of models available for lending including one book/person which

is the same as the model followed by the libraries normally in case of paper books, that one issue is limited to one user only.

2.2 Case Study: Amazon[2]

Amazon allows exchange of e-books purchased through its kindle devices.it allows lending of e-books up to 14 days. During this time, the e-books becomes unavailable to the owner for reading in its device. But this service is limited to its kindle devices and on books purchased through Amazon only, that too in its limited format (not PDF).

2.3 Case Study: HOOPLA[5]

HOOPLA is a digital platform based in the US. Instead of the usual book/user approach HOOPLA uses a new business model. It offers books, not individual books but rather allows them to select a catalogue. The libraries are charged according to the number of books and the titles of books issued by the library to its member on per lending basis. This helps library to make available a wide range of books to its users without having to pay for each book in catalogue in advance. The prices of book/lend is decided by publisher, and at the end of billing cycle, it is provided to the library.

3. SOLUTION

The above studies show that there doesn't exist a universal platform for e-book lending which is beneficial for all the benefactors using e-books.

- We propose a solution in which an e-book will be distributed in fragments. To illustrate this, here is a sample situation:

Suppose there is an engineering undergraduate student who wishes to study Heat transfer from a book, Engineering Thermodynamics by P.K. Nag. The e-book is currently available for 537 on Flipkart[4]. Using our service he will only be able to access 20 pages at a time and will be charged accordingly. This will be more economical as well as well allow us to share a single publication to various lenders without breaching any copyright issues, i.e., he will pay for 80 pages containing the topic Heat Transfer.

Such scenarios leverage the power e-books as this is not possible in normal printed books without damaging them. Additionally this will benefit the entire chain involved:

- Publisher – More accessibility and widened consumer range.
- Lender/Library – Consumers/Members will be catered specific to their demands and hence increased involvement of people.
- User – To-the-point services with cheaper access by paying only for what they want.

Figure: Requests from server → Central server / E-book store (Library) ↔ Consumer (Requests e-book / Specifies pages). Requested pages are streamed 20 pages a time
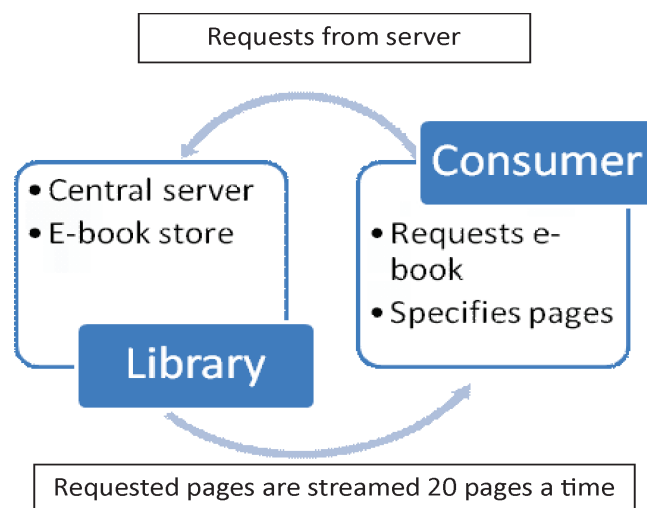
3.2 Implementation Model

The consumer requests for the required fragment from the e-book which are provided to him in packets of 20 pages and charged accordingly. These pages are directly streamed, to user devices and hence user is never given access to entire e-book. Also since these are streamed the content is limited to his device only and hence, can't be shared by him.

In this model we also propose a provision for the publisher or author to price the content section wise. This way, the more popular content can be priced accordingly.

4. RESULTS

- The model can be implemented universally irrespective of retailer/library, at the same time the publisher himself will hold the rights to entire book without jeopardizing the distribution cycle.
- This model actively prevents piracy of e-books and adds more meaning to copyrights, while it provides cheaper solutions to users, it also benefits the publisher and intermediaries, viz. library, retailer.
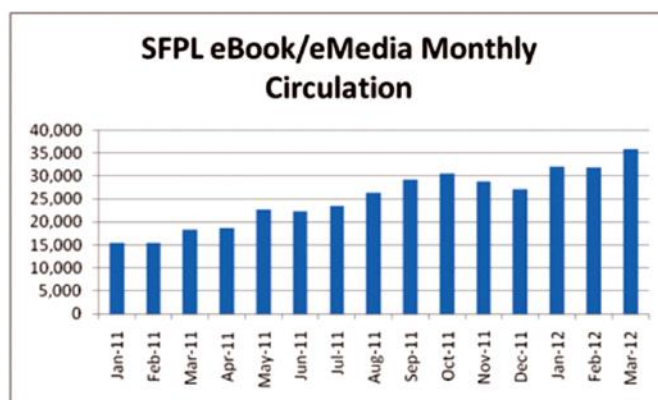
Figure 2. Growth of E-book lending chart: San Francisco public library.

5. DISCUSSION

The proposed model of e-book lending has multiple benefits but at the same time some shortcomings are foreseen.

• The already established services face a common complaint from publishers that a hard copy of book gets worn and torn over time which makes the library/retailer buy a new issue of the book, while here this scenario is not possible. This causes the former to be at loss. In order to deal with this problem, we suggest a provision where library/retailer will have to buy the licenses from publisher, which would expire after certain. Renewal of each license would be another source of income for the publisher.

• Another problem faced could be piracy. To avoid this, a cache module would be implemented to store the user-specified pages locally in an encrypted form.

This model can have a future scope of implementing a rent model, whereby the user will get an option to rent the e-book for a specified and re-rent it again to access it again. The renting model will be designed to work in parallel with the existing e-retail, e-book selling system. This makes the entire model a universal solution to e-book lending and issuing.

6. CONCLUSION

In the current scenario, we have multiple e-resource management systems working. Some of these have been illustrated in the course of this paper, viz., Overdrive, Amazon, Hoopla.

With ever growing consumer base, they face various challenges. The challenges have been studied and a conclusive solution is provided. The solution system aims at a new way of e-book lending and renting. It would work on pay-as-you-read format.

Its various advantages have been listed where it is shown that the suggested implementation benefits the entire chain involved, i.e., publisher, lender/library and the consumer.

निष्कर्ष

वर्तमान परिदृश्य में हमारे पास कई ई–संसाधन प्रबंधान प्रणालियाँ काम कर रही हैं। उनमें से कुछ का इस पेपर अर्थात पाठक्रम में वर्णन किया गया है जैसे ओवरडराइव, अमेजन, हूपला।

उपभोक्ताओं में बढ़ोतरी के साथ ये विभिन्न चुनौतियों का सामना कर रहे हैं। इन चुनौतियां का अध्ययन किया गया है और निर्णायक समाधान प्रदान किए गए हैं। इस समाधान प्रणाली का लक्ष्य ई–बुक को उधार और किराये पर देने का नया तरीका देना है। यह आपके पढ़ने पर भुगतान के प्रारूप पर काम करेगा।

REFERENCES

1. BISG's Consumer Attitudes Toward E-Book Reading. Nielsen Book Research. 2013.

2. Amazon.com lend or borrow e-books. (n.d.). Retrieved from www.amazon.com: http://www.amazon.com/gp/help/customer/display.html/ref=hp_rel_topic?ie=UTF8&nodeId=200549320

3 Baldwin, R. (n.d.). 3M Cloud Library Lends Not Only E-Books, But Also E-Reader Hardware. Retrieved from www.wired.com: http://www.wired.com/2012/04/3m-cloud-library-lends-not-only-e-books-but-also-e-reader-hardware/

4. Enineering Thermodynamics. (n.d.). Retrieved from Flipkart: http://www.flipkart.com/engineering-thermodynamics-5e/p/itmdqx8rm6ysyvd6?pid=DGBDQX8HVMPYHXNN&otracker=from-search&srno=t_1&query=thermodynamics+by+pk+nag&ref=ef59c549-3164-484a-b089-5557762356b5

5. Hoopla (Digital media service). (n.d.). Retrieved from Wikipedia: http://en.wikipedia.org/wiki/Hoopla_%28digital_media_service%29

6. OverDrive: e-books. (n.d.). Retrieved from Overdrive: www.overdrive.com

7 Thomson, D. Innovation in E-book Lending. International publishers association. 2014.

ई–संसाधन और सशक्त पुस्तकालय उपयोगकर्ताः एक समीक्षा
E- Resources and Empowered Library Users : A Review

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सारांश

आधुनिक पुस्तकालय बड़ी संख्या में ई–आधारित सेवा प्रदान कर रहे हैं। आज सभी पुस्तकालय उपयोगकर्ता ई–पुस्तकें, ई–पत्रिकाएं, रिपोर्ट, मानक आदि को अपने कार्यस्थल पर प्राप्त कर रहे हैं। सभी पुस्तकालय उपयोगकर्ता शिक्षा और अनुसंधान एवं विकास दोनों गतिविधियों के लिए ई–संसाधनों को अत्यधिक उपयोगी और सुविधाजनक पा रहे हैं। यह आलेख डीआरडीओ ई–सेवाओं के संदर्भ में सशक्त पुस्तकालय उपयोगकर्ताओं के नए विकास और बेहतरी की समीक्षा करता हैं।

ABSTRACT

Modern libraries are providing large number of e-based services. Today all library users are able to access e-books, e-journals, Reports, Standards etc. right at their work place. All library users are finding e-resources highly useful and convenient both for purpose of education and research and development activities. This paper reviews new developments and growth of empowered library users in the context of DRDO e-services.

Keywords: information technology, empowered users, digital library, e-journals.

1. INTRODUCTION

The last decade has seen growth of e-based services in all types of libraries. Today concept of empowered library users is a reality. E-based services hold key to easy access to information mainly due to network facilities and shift from print to e-documents. Today's library user's approach towards information has shifted and emphasis is more on multidisciplinary areas and image based contents. The paper reviews DRDO libraries in the above context and requirements of empowered library users.

2. EMPOWERED USERS

DRDO is procuring about 530 e-journals. All libraries in DRDO are having access to them and users are happy with paradigm shift in information services. From 2009 e-based services have been used by large number of library users. All libraries in DRDO are also procuring e-documents as per their lab requirements. Today users are having access to large number of e-books, e- journals, reports, conference papers, etc. This helps in R&D activities, study of multi disciplinary subjects etc. There is no doubt library users are empowered due to e-services. The main features of digital world are access to large collections, user

empowerment and radical change of user's approach to information, etc. The empowered user wants easy and fast access to information services irrespective of location of the same. The library user wants to rely less on libraries and believes self searching can help in information access[1]. The user is willing to learn complex strategies and terminologies to handle problems of technology driven services. The users are playing active role in controlling and filtering of information compared to earlier generations. There is no doubt digital information is popular and will always have an increased demand as per user requirements. The problem areas of users is need for better network facilities and better procurement policies for documents not available on net. A large number of conference papers, reports and standards are not easily available. It is clear net based services either fee based or free services serve as a means to an end. But net based services also have their limitations and problem areas to meet all user needs.

3. IMPLICATIONS FOR LIBRARIANS

Today librarians need to understand implications of digital environment to provide better service to users. The problem areas for librarians are as follows:

a. Information is getting doubled in less than two years.
b. Digitization is integral part of information management and thus expanding the reach of information.
c. The sphere of library activities is getting wider.
d. The sharp fall in users visit in all type of libraries focuses library staff to understand user concerns by providing solutions to current and potential users.
e. Library staff has to develop multifaceted professional competence.
f. Repackaging of information services and products as per users need is the order of the day.
g. Greater importance for internally generated born digital contents is growing in leaps and bounds.

The net result of empowered library user is need for change of traditional library services by encouraging user's feedback and participation in the design and implementation of library services[2]. Inspite of many technology driven services there is a wide gap between user needs and availability of information. Keeping in view users interest many libraries in DRDO have initiated following steps for modernization of library services. Some of the key features are as follows:

a. Development of web based services as per current trends.
b. Development of unified search interface for variety of e-resource
c. Development of institutional repositories.
d. Greater emphasis on user education.
e. Training programs for library staff in all areas of IT based services.

It's clear to see that the digital world is shifting the way we do things and this definitely includes the way we meet user requirements. This can be seen as additional pressure on libraries to sharpen their skills in the face of increasing and varying user needs.

4. CONCLUSION

The empowered library user concept is a reality. The focus will be more on users requirements and librarians have to develop domain expertise to handle diverse set of users and ever increasing variety of information sources. The problems of today and tomorrow can be solved only by resource sharing at national level and open access resources will play key role in dissemination of information. Today IT based services provide both opportunity and challenges to library staff. The key IT resources are not only technology but also people, contents and economics. Library professionals have to take full advantage in present IT scenario by understanding potential of technology based learning and services.

निष्कर्ष

सशक्त पुस्तकालय उपयोगकर्ता अवधारणा एक वास्तविकता है। उपयोगकर्ताओं की आवश्यकताओं पर अधिक ध्यान देना होगा और पुस्तकालयाध्यक्षों को विविध प्रकार के उपयोगकर्ताओं और उनकी बढती हुई सूचना संसाधनों की मांग को पूरा करने के लिए डोमेन विशेषज्ञता को विकसित करना होगा। आज और कल की समस्याओं को राष्ट्रीय स्तर पर सूचना संसाधन के अदान–प्रदान से ही हल किया जा सकता है। मुक्त स्त्रोत सूचना संसाधन इसके प्रचार–प्रसार में महत्वपूर्ण भूमिका निभाते हैं। आज सूचना प्रौद्योगिकी आधारित सेवाएं पुस्तकालय कर्मियों के लिए अवसर और चुनौतियाँ दोनों प्रदान कर रहे हैं। प्रमुख आईटी संसाधनों में न केवल प्रौद्योगिकी शामिल हैं अपितु लोग, कंटेन्ट और अर्थशास्त्र भी हैं। पुस्तकालय पेशेवरों को प्रौद्योगिकी आधारित शिक्षा और सेवाओं की क्षमता समझकर वर्तमान आईटी परिदृश्य में पूरा लाभ उठाना चाहिए।

REFERENCES

1. Sridhar, MS. Digital environment: Users empowered and librarians deserted, Feb 2011. https://www. scribd.com/doc/47940475/Digital-Environment-Users-Empowered-and-Librarians-Deserted [Accessed on 5 December 2014]
2. Casey, Michael E & Savastinuk, Laura C. Library 2.0: Service for the next generation library. Library Journal, 2010, May. http://lj.libraryjournal.com/2010/05/technology/library-2-0/ [Accessed on 5 December 2014].

डीआरडीओ पुस्तकालयों की पुस्तकों की संघीय सूची : डीआरडीओ के भीतर संसाधन साझा करना
Union Catalogue of Books of DRDO Libraries: Resource Sharing within DRDO

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सारांश

यह शोधपत्र एक नेटवर्क वातावरण में पुस्तकालयों के बीच संसाधनों को साझा करने में संघीय कैटलाग के महत्व पर प्रकाश डालता है। यह शोधपत्र डीआरडीओ पुस्तकालयों/सूचना केन्द्रों की पुस्तकों की संघीय सूची विकसित करने के लिए रक्षा वैज्ञानिक सूचना एवं प्रलेखन केंद्र (डेसीडॉक), डीआरडीओ द्वारा की गई पहल का वर्णन करता है। इस शोधपत्र में डीआरडीओ की पुस्तकों की संघीय सूची के विकास में विभिन्न प्रयोगशालाओं/प्रतिष्ठानों से ग्रंथ सूची डेटा संग्रह सहित सॉफ्टवेयर विकास और इसकी मुख्य विशेषताओं की भी चर्चा की गई है।

ABSTRACT

This paper highlights the importance of union catalogues in resource sharing amongst libraries in a networked environment. The paper describes the initiative taken by Defence Scientific Information and Documentation Centre (DESIDOC), DRDO to develop the Union Catalogue of Books of DRDO libraries/information centres. DRDO Union Catalogue of Books development including bibliographic data collection from various laboratories/establishments, software development and its salient features are discussed in this paper.

Keywords: DESIDOC, networked environment, bibliographic data collection

1. INTRODUCTION

Defence Research and Development Organisation (DRDO) is one of the premier organisation in India having more than 50 laboratories and establishments spread across the country. It is engaged in the development of systems, subsystems and technologies for defence and civil applications. The subject areas cover a wide range of science, engineering and technology disciplines. Each laboratory has its own library/ technical information centre to cater the information needs of its scientists and researchers. Many times, scientists and researchers of one laboratory need to get the books/information resources available in another laboratory. With the emergence of Internet, information kept in different locations can be made available at our finger tips. Advances in ICT have brought the paradigm shift in the way of working of libraries and information centres. Resource sharing amongst libraries having common objectives is facilitated in a networked environment. Union catalogues are one of the tools which facilitate the resource sharing amongst libraries. It provides information about availability of

a document in the member libraries. Initiatives have been taken worldwide to develop union catalogues. This paper briefly discusses the initiative taken by Defence Scientific Information and Documentation Centre (DESIDOC) in DRDO to develop the Union Catalogue of Books of DRDO libraries/information centres.

1.1 Union Catalogue

A union catalogue is a list of holdings of two or more libraries having bibliographic details of the documents and their location to indicate which library owns it. It helps to bring together the works of the same author or on same subject locating in different libraries. Earlier, they were created in print form but in the networked environment they are developed in the form of electronic databases. Its advantages are for both libraries and its users are:

(a) Union catalogue provides a coherent view of the holdings of multiple libraries with their location to the users.

(b) It facilitates consistent searching of records.

(c) It helps to maintain acceptable standards.

(d) It facilitates inter library loan.

(e) It helps in acquisition and cataloguing amongst cooperating libraries.

1.2 Prominent Union Catalogues

Several initiatives have been taken at international and national level to develop union catalogues. WorldCat, OhioLINK Library Catalogue, National Library of Australia Catalogue, British Library Union Catalogue-Explore the British Library, are some of the Union Catalogues at international level. IndCat and DELNET Union Catalogue are the major union catalogue of books in India.

1.2.1 WorldCat

WorldCat is the world's largest library catalog which is international in scope having records from the libraries from all over the world. As of now, WorldCat has more than 332 million bibliographic records representing more than 2 billion items held by participating libraries (http://www.oclc.org/worldcat).

1.2.2 IndCat

IndCat is the Online Union Catalogue of Indian Universities developed by INFLIBNET. It has the bibliographic description of documents (books, theses and journals) available in more than 160 university libraries across the country. It provides different interfaces to search its three components, viz. books, theses and journals. It contains more than 12 million bibliographical records of books from participating libraries. Inter-library loan requests can be made directly through its web-interface (http://indcat.inflibnet. ac.in/).

1.2.3 DELNET Union Catalogue

DELNET (developing library network) maintains several union catalogues and databases. Its union catalogue of books contains more than 17 million bibliographic records at present. It is searchable to its member libraries only and helps in making inter-library loan requests (http://www.delnet.nic.in/ Del-New1.pdf).

2. DRDO INITIATIVE FOR DEVELOPMENT OF DRDO UNION CATALOGUE OF BOOKS

Defence Research and Development Organisation (DRDO) is one of the premier organisation in India having more than 50 laboratories and establishments spread across the country. Most of the laboratories/establishments are having their own library/technical information centre containing rich collection of S&T literature available in their field to cater the information needs of its scientists and researchers. However, scientists and researchers of one laboratory also need to get the books/information resources available in another laboratory for their R&D activity. DESIDOC, one of the constituent establishments of DRDO dedicated to provide latest S&T information to the DRDO scientific community, took the initiative to develop web-based Union Catalogue of Books of DRDO Libraries/Technical Information Centres.

2.1 Process of Development of DRDO Union Catalogue of Books

The development process of DRDO Union Catalogue of Books can be categorized into following phases:

(1) Data collection from various DRDO laboratories/ establishments

(2) Software development

(3) Data migration in the developed software and validation of data

(4) Value addition to the records for better retrieval

(5) Hosting of DRDO Union Catalogue of Books on DRDO intranet and its regular updation

Each of the phases is further subdivided into various sub-phases to streamline the work of each phase.

2.1.1 Data Collection

Bibliographic data of the books from various DRDO laboratories is collected either in machine-readable format or in handwritten form. Some of the DRDO libraries are automated using different software packages according to their needs. Software used in these libraries are ranging from commercial library automation software, software provided by DESIDOC, and in-house developed library automation software. However, libraries in few laboratories are still not automated so their books holding data was collected as photocopies of handwritten accession registers. Data in machine-readable format was provided in various file formats by different DRDO libraries such as MS Access file, MS Excel file, MS Word file, MySQL file, pdf file, text file, SQL backup file, and MARC file. To date, data from 47 laboratories/establishments with more than 5 lakh records has been collected.

2.2 Software Development

Detailed requirements/features of the software for the Union Catalogue of Books were prepared. Based on the requirements it was found that new software is needs to be developed. Customized software is developed based on Exalead software as the search engine. The software is using Java as frontend, MySQL as DBMS and it is running on Linux platform.

The data collected lacks consistency and standards for bibliographic descriptions. Moreover, it is very difficult to extract the data from the file formats such as pdf

file, text file and MS Word file. To process the files of different file formats custom connectors are made in the software which parse the records and put them in the MySQL table according to MARC format.

The developed software is serving three types of clients: (1) Users, (2) Individual lab administrator/librarian, and (3) super administrator. Overall administrator is DESIDOC which has all control over the Union Catalogue of Books.

Some of the salient features of the developed software are: User friendly search interface, advanced search features using boolean operators, proximity search and range search, search results limitation feature, search within search feature, custom connectors to import data available in different file formats, cataloguing module for retro-conversion, feature for editing the records, facility for individual lab to upload/enter the records of their library, download records details in CCF/MARC format, print records, export lab data in CCF/MARC/ASCII format, book requests for inter-library loan, notifications/various reports, profile management, duplicate checking while merging the records and realtime status of availability of books where standard library software is used in DRDO labs.

2.3 Data Migration and Validation

The software has provision to import the files having bibliographic records of various labs. The software has also the cataloguing module through which records can be inputted manually. The records which are imported or entered manually are kept in temporary OPAC. The super administrator approves these records after validation to merge them into the main OPAC. Software has provision to check the duplicate records before merging. The records available in main OPAC are searchable through search interface of the software.

2.4 Value Addition

Most of the bibliographic data provided by different laboratories lacks several bibliographic fields. Keyword is the important field which helps in better retrieval of required documents. To make DRDO Union Catalogue of Books more user-friendly in searching, keywords are being given.

2.5 Hosting on DRDO Intranet

The Union Catalogue of Books software is in final phase of testing. Once the Union Catalogue of Books
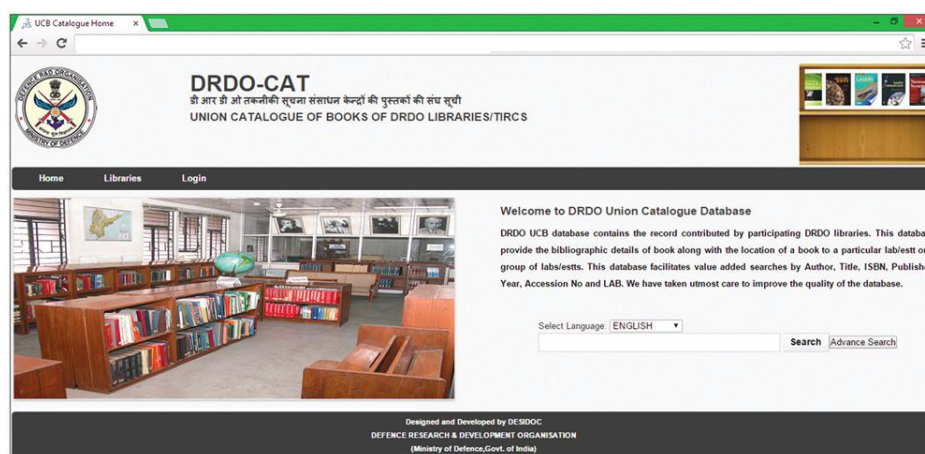
Figure 1. Home-page of DRDO union catalogue of books.
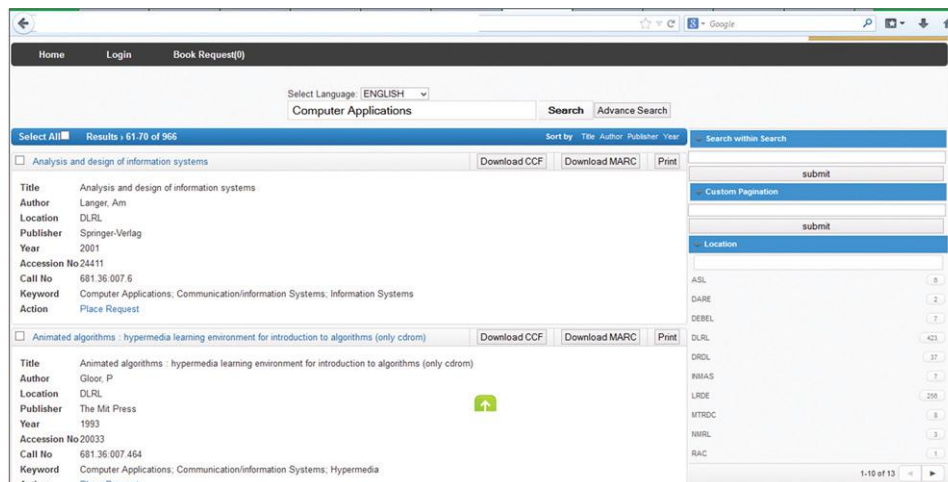
Figure 2. Search results in DRDO union catalogue of books.

software is fully developed, it will be made functional by hosting it on DRDO intranet. It can be accessible to all DRDO scientific and technical community as a part of DESIDOC services. As libraries acquire books on regular basis the regular updation of Union Catalogue of Books will be carried out with the participation of individual DRDO laboratories.

3. CONCLUSIONS

The union catalogues are important tools for resource discovery in a networked environment. They help in resource sharing amongst participating libraries through inter-library loan. DESIDOC provides high quality library and documentation services to the scientific community of DRDO. DESIDOC has taken the initiative to build the DRDO Union Catalogue of Books to provide a central access point to search the required document in multiple libraries within DRDO. With this Union Catalogue of Books, user can find the location of a book and can send the book request e-mail for inter-library loan to their library directly from the union catalogue of books interface. With provision of Individual Laboratory Login, each lab can upload/enter their bibliographic data in the Union Catalogue of Books on regular basis in future. Participation of individual laboratories is required to keep the Union Catalogue of Books updated.

निष्कर्ष

संघीय सूचियां एक नेटवर्क वातावरण में संसाधन की खोज के लिए महत्वपूर्ण उपकरण हैं। यह अंतर–पुस्तकालय ऋण के माध्यम से पुस्तकालयों का उपयोग करने वाले लोगों के बीच संसाधनों को साझा करने में मदद करती हैं। डीआरडीओ में डेसीडॉक डीआरडीओ के वैज्ञानिक समुदाय के लिए उच्च गुणवत्ता युक्त पुस्तकालय और प्रलेखन सेवाएं प्रदान करता है। डेसीडॉक ने डीआरडीओ के भीतर कई पुस्तकालयों में आवश्यक दस्तावेज खोज करने के लिए एक केंद्रीय पहुँच बिंदु प्रदान करने के लिए पुस्तकों की डीआरडीओ संघीय सूची के निर्माण के लिए पहल की है। पुस्तकों के इस संघीय सूची के साथ, उपयोगकर्ता एक पुस्तक के स्थान का पता लगा सकते हैं और संघीय सूची के पुस्तक इंटरफेस से सीधे उनके पुस्तकालय के लिए अंतर–पुस्तकालय उधार के लिए पुस्तक अनुरोध ईमेल भेज सकते हैं। व्यक्तिगत प्रयोगशाला लॉगिन के प्रावधान के साथ, प्रत्येक प्रयोगशाला भविष्य में नियमित आधार पर पुस्तकों की संघीय सूची में अपने ग्रंथ सूची डेटा को दर्ज/अपलोड कर सकती है। पुस्तकों की संघीय सूची को अद्यतित रखने के लिए विभिन्न प्रयोगशालाओं की भागीदारी आवश्यक है।

REFERENCES
1. DELNET. DELNET Brochure. http://www.delnet. nic.in/Del-New1.pdf.
2. IndCat. http://indcat.inflibnet.ac.in/
3. WorldCat. http://www.oclc.org/worldcat

पुस्तकालय संघों के लिए सूचना प्रौद्योगिकी का महत्व : डीआरडीओ ई–जर्नल संघ का एक मामला अध्ययन

Information Technology for Library Consortia: A Case Study of DRDO E- Journals Consortium

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सारांश

पुस्तकालयों और सूचना केन्द्रों के विकास में सूचना प्रौद्योगिकी एक महत्वपूर्ण भूमिका निभा रही है। सूचना प्रौद्योगिकी से ऐसी कोई भी चीज अभिप्रेत है जो संगणन प्रौद्योगिकी से संबंधित होती है।वर्तमान में अधिकतर पुस्तकालय वेब ओपीएसी, ई–जर्नल, ई–बुक, रिपोज़िटरीज, डिज़िटलीकरण और डिजिटल पुस्तकालय, इत्यादि की सुविधा रखते हैं। यह पत्र भारत में विद्यमान संघों की प्रमुख विशेषताओं और उनके पक्ष–विपक्ष, सर्वोत्म संघ मॉडल जो आपके संगठन के लिए उपयुक्त होगा, भारत में विद्यमान संघों की वर्तमान स्थिति और संरचना,सभी डीआरडीओ प्रयोगशालाओं / संस्थापनाओं के लिए ई–जर्नल सेवा (संघ) को कार्यान्वित करने हेतु डीएसआईडीओसी की भूमिका, आंकड़ों का विश्लेषण, जो जब और जैसे अपेक्षित हो, मुख्य ग्राहकियों का चयन करने में पुस्तकालयाध्यक्ष के लिए सहायक होता है, को दर्शाता है।

ABSTRACT

Information Technology (IT) is playing vital role for developing the libraries and information centres. IT refers to anything which is related to computing technology. Presently majority of libraries are facilitating with web OPAC, E-journals, E-books, repositories, digitization, digital library, etc. This paper depicts the silent features of library existing consortia in India and their pros and cons. Best consortium model that will be suitable for any organization. Current position and structure of the existing consortia in India. The role of DESIDOC for implementation of E-journals service (consortium) to all DRDO labs/ estts. The analysis of data, which is helpful to librarian to select the core subscriptions as and when required.

Keywords: Library consortia, electronic journals, electronic resources, e-journals service, consortia model, consortia management, information technology

1. INTRODUCTION

Information Technology (IT) has made significant contribution in all aspect of day to day life, for example, majority of peoples are using mobile phones, watching television, listening to radio, using computer, etc. The impact of IT can be seen in all areas like medical, agriculture, robotics, etc. Information technology provides very advance facilities like video conferencing, satellite communication, clouds computing, networking, and artificial intelligence in robots. IT refers to anything which is related to computing technology such as software, hardware, networking, communication, etc. The implementation of IT has changed the structure of libraries. Earlier libraries were using printed catalogues to locate the books, and reading materials, printed accessing register, card system for circulation of books, manual stock taking of reading materials,

photocopies of all requested articles, etc. The entire above-mentioned library activities were time-consuming. With the passage of time, the technology has brought a change in the society and has moved it into a paperless society. Now the majority of libraries are using online public access catalogues (OPACs) to find the location of reading materials. Library has converted their printed materials into digital format with metadata searching and browsing. Libraries are using barcode and RFID technology for stock verification and automatic circulation of reading materials.

2. OBJECTIVES OF THE STUDY
- To find the role of information technology for library consortia.
- To find the utilization of E-journals under consortium among DRDO scientific community.

3. SCOPE OF THE STUDY

The research study covered the survey of all existing library consortia in India. The data of Indian library consortia have been collected from website, research papers and presentations given by coordinators of consortia at various platforms. However the data for DRDO library consortium has been collected from feedbacks, survey and downloads of articles.

4. METHODOLOGY

The data was collected from various sources and methods like website of institutions, lectures, presentation, and publisher's websites using login, and distributing questionnaire. The analysis of data provides the utilization of e-journals under Consortium. The standard protocol named standardized usage statistics harvesting initiative (SUSHI) has been implemented to harvest the e-journals usage data directly from publishers side. Both HTML and PDF downloads of full-text articles were taken for evaluation.

5. FEATURES OF LIBRARY CONSORTIA

- These provide each organization/institution to share its e-resources having the same mission and usages.
- These provide centralized negotiations for all sites. So that organizations/institutions can get more discounts.
- E-resources can be accessed either as IP restricted or with login facility with unlimited access, downloading, searching, browsing and printing facility.
- Consortium has cooperative task to reduce the cost of purchase and provides more resources on least cost.
- Library manpower can be utilized in other related tasks, as these provide centralized purchasing.
- A consortium provides real-time usages statistics of e-resources, so that in future one can take the decision to continue the subscriptions, or not.
- Under Consortium approach, the majority of Publishers provide post-cancellation perpetual access, archiving facility on CLOCKSS and PORTICO, Legal agreement and more than 95 per cent uptime of service.
- Bring development of uniformity for each organization/ institution.

6. PROS & CONS OF LIBRARY A CONSORTIUM

The implementation of a library consortium always increases your library budget. Because once you convert your print subscriptions into electronic subscriptions through consortium approach, publishers take base price as a cost of current print subscriptions and then charges cross-access fee on per site basis on the existing cost. However the increase of 10-15 per cent is reasonable because library gets more online resources. The following are the pros & cons of a library consortium:

- Consortium approach provides full package of electronic resources, so that library gets extra subscription, which is not required by R&D institutions (special library). However Consortium approach is best for academic libraries.
- It provides backfile access along with the current subscription without paying extra fee.
- Helpful to provide better library services like inclusion of RSS fields, individual profile creation on publisher's website, ILL through email or direct through web portal, unlimited downloading, searching, browsing and printing facility.
- As the service is activated from Publisher's side, so we always get online access on-time, no delay of missing issues, no needs to binding and worried on stealing of resources.
- Optimum utilization of funds.
- E-resources can be accessed anytime, anywhere, so that users can utilize maximum time beyond officer hrs. As well as e-resources can be read by multiple users at a time.
- Requirement of sufficient and latest infrastructure to access online contents, sometimes library is not capable to procure.

7. CONSORTIUM MODEL

A Consortium is a group of two or more organizations/ institutions that come together to achieve the goal having same objectives and sharing of resources. A formation of library consortium can be local, regional, state, national and inter-organizational/institutional levels. All library consortia was formed on inter-organizational basis in India. It is very difficult to define consortium model, because every institution adopted mixed consortium. Few learned professional fellows defined consortium model as per the affiliations and funding sources like open consortium, closed group consortium, centrally funded model, publisher's initiatives, shared budget model, and National Consortium. While few learned professionals have defined consortium model as per the access and subscriptions like cross-access model, package/ bundle, subscription-based model, pick and choose model, and mixed model.

8. INDIAN LIBRARY CONSORTIUM

The consortium is formed on the basis of users requirements, and readers are differs from library to library like for academic library users may be faculties, students, research scholars, while for a special library (R&D institutions), users may be scientists and research scholars. The following are the

Table 1. Operational consortia in India

Name of Consortium	Discipline	Funded Agency	Year of Establishment
DAE	Atomic Energy	DAE	2001
NKRC	S&T	CSIR-DST	2002
INDEST - AICTE	Engineering	MHRD	2003
UGC – INFONET	Academic	UGC	2004
MCIT	Communication and Information Technology	MCIT	2005
CeRA	Agriculture	ICAR	2007
DeLCON	Biotechnology	MST	2009
RGUHS – HELINET	Medicine	RGUHS	
ISRO	Space Science	ISRO	
DRDO E-journals Service	Defence	DRDO	2009
FORSA	Astronomy	IIA	

consortia (Table 1) that exist in India: Department of Atomic Energy (DAE); National Knowledge Resource Consortium (NKRC); Indian National Digital Library in Engineering Sciences and Technology (INDEST); Rajiv Gandhi University of Health Science – Health Library Network (RGUHS-HELINET); Forum for Resource Sharing in Astronomy (FORSA); (Dept of Biotechnology) E-Library Consortium (DeLCON: DBT).

9. IMPLEMENTATION OF DRDO CONSORTIUM

The Defence Research and Development Organisation (DRDO), Ministry of Defence (MoD), Government of India, is a premier organization with approx 50 laboratories and establishments all over the India. Each DRDO lab has an independent and well established library. Defence Scientific Information and Documentation Centre (DESIDOC), a unit of DRDO, is a central agency for all libraries. In the year 2006, DESIDOC organized the Heads of TIRC/libraries meeting and suggested to setup E-journals consortium for DRDO libraries. The data was collected from all DRDO labs/ estts and analyzed, and presented to the competent authority on needs, advantages, budgetary requirement and methodology of realization of consortium. Competent Authority was a committee with certain terms and reference under the Chairmanship of Prof. GP Agarwal, National Coordinator, INDEST Consortium, IIT Delhi. The Committee recommended a separate Consortium for DRDO as the requirement of DRDO is specific.

Finally the DRDO E-journals Service (consortium) was implemented 1st January 2009 covering 07 publishers and one service provider. To evaluate the service a monitoring committee was constituted by the competent authority. The monitoring committee of e-journals having members from all clusters. For 2014 DESIDOC has renewed/subscribed the following publishers and service providers to DRDO labs (Table 2):

Table 2. Subscribed E-journals under DRDO consortium for the year 2014

Name/ Description of Items/ Service(s)	Qty	DRDO Labs
AAAS/ Science	One E-Magazine	11 DRDO Labs
IEEE/ IEL Digital Library	Full Package	All DRDO Labs + ADA
ACM Digital Library	Full Package	5 DRDO Labs
AIAA E-journals	7 E-journals	10 DRDO Labs
ASME	10 E-journals	10 DRDO Labs
IHS Jane's	05 Magazines	10 DRDO Labs
Elsevier (Science Direct)	197 E-journals	42 Labs on Subscription basis + 06 UTL Access
Nature Publishing Group (NPG)	15 E-journals	27 Labs on Subscription basis
Taylor & Francis (T&F) Group	51 E-journals	23 Labs on subscription basis
Informatics India (P) Ltd	JCCC Service	All DRDO Labs
Open Athens: Remote Access Facility	2000 Users	All DRDO Labs

Table 3. Ranking of E-resources on the basis of downloads

	ACM	ACS	AIAA	ASME	Elsevier	IEEE	Janes	NPG	Science	T&F
2009	2339	24103	5087		598902	123234	21451		1353	
2010	4227	27422	11890		216064	162066	6127	1675	1050	
2011	1731	26727	36281		208620	155785	5378	1906	1388	
2012	1559	26950	14505	3648	201338	171588	6439	2537	2053	5200
2013	1492		6659	2549	197248	172740	11097	4518	922	24092
2014 (upto May)	350		2923	29991	206951	72975	1074	7770	29883	3473
Average download Per Year	1950	26301	12891	12063	271521	143065	8594	3681	6108	10922
Grand Total [2009 - 2014]	11698	105202	77345	36188	1629123	858388	51566	18406	36649	32765
Rank	10	3	4	7	1	2	5	9	6	8
Rank on AVG	10	3	4	5	1	2	7	9	8	6

10. DATA ANALYSES

The data collected from 10 publishers websites and feedbacks received from DRDO scientists were analyzed. However number of journals varying on each publisher i.e. the subscription of AAAS/ Science is only for one magazine while IEEE contains more than 150 e-journals on cross access model. The subscription of NPG e-journals was started w.e.f. 1st March 2010 with only one e-journals, however 15 new titles with 108 subscriptions were added during 2014 under NPG. The subscription of ASME and T&F was started w.e.f. 1st January 2012. The service to online access of ACS e-journals has been discontinued after 31st December 2012 due to unjustified reason to increase very high price and changes of publisher's price. The access of contents has been unlimited to all subscribed labs on IP bases. However the access has been extended anytime, anywhere by using Open Athens authentication mechanism from 2013 to all Labs.

The total downloads (approx 28.5 lakh articles of 10 publishers) during 2009-2014 (up to May) is shown in Table 3. The usage of Elsevier and Jane's was maximum in 2009, ACM and ACS in 2010, AIAA in 2011, IEEE and T&F in 2013, and ASME, NPG and Science in 2014, while during 2012, there was no high usage as compare to other years. The
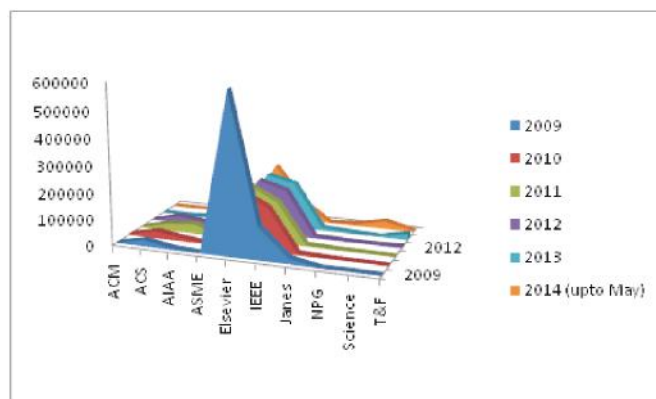
Figure 1. Downloads of articles under DRDO consortium.

resources were ranked on the basis of total downloads of articles and found that Elsevier ranked 1st and ACM ranked 10th, however the ranking of publisher was also affected by the number of titles and subscriptions of e-journals.

During 2013, data was collected from DRDO scientists/ officers regarding feedback/ suggestion to improve the e-journals service. The impact of information technology can be seen in Table 4, that more than 83 per cent of users preferred e-journals and more than 77 per cent users were having proper infrastructure.

Table 4. Feedback/ suggestions received from individual scientists

Questioner	% in Yes	% in No	No Response in %
Do you find E-journal service useful for your project?	83.33	--	16.67
Do you get timely response from DESIDOC to your queries?	66.67	--	33.33
Do you find any problem in accessing E-journals service?	16.67	72.22	11.11
Do you require any awareness/ training programme?	50	50	--
Do you have an internet facility on Desktop?	77.78	16.67	5.56
Would you prefer print journals in place of E-journals?	22.22	72.22	5.56

Table-4 is taken from article vide reference no. 1 listed at the end of this paper

11. CONCLUSION

Using information technology, libraries have changed their role, now librarian is called the information manager. The consortium provides latest and relevant information right of the users' Desktops. It cannot be made possible without proper IT infrastructure. Every organization/institution is moving forward with Consortium approach. The research study for the period of 2009– 2014 has shown the usage and positive impact on the minds of scientific community. Now majority of users would like to prefer only e-resources instead of print subscriptions. Every year, DESIDOC has been adding new titles and more subscriptions as per the requirements of laboratories. With the help of information technology it has became very easy to remove and add any content. The analysis of study shows the popularity of e-resource among the consortia and necessarily of information technology for implementation.

12. ACKNOWLEDGEMENTS

निष्कर्ष

सूचना प्रौद्योगिकी का उपयोग करके पुस्तकालयों ने अपनी भूमिका बदल ली है, अब पुस्तकालयाध्यक्ष को सूचना प्रबंधक कहा जाता है। संघ प्रयोक्ता के डेस्कटॉप पर नवीनतम और संगत सूचनाएं प्रदान करता है। यह समुचित सूचना प्रौद्योगिकी अवसंरचना के बिना यह संभव नहीं हो सकता है। प्रत्येक संगठन/संस्था संघ पद्धति के साथ आगे बढ़ रही है। वर्ष 2009–2014 की अवधि के लिए किए गए अनुसंधान अध्ययन ने विशिष्ट समुदाय में इसके उपयोग और उनके मन पर इसके सकारात्मक प्रभाव को दर्शाया है। अब अधिकतर प्रयोक्ता मुद्रित प्रकाशनों के बजाय केवल ई–संसाधनों को ही पसंद करेंगे। प्रत्येक वर्ष डीईएसआईडीओसी ने प्रयोगशालाओं की आवश्यकताओं के अनुसार नई पुस्तकें और अधिक ग्राहक जोड़ें हैं। सूचना प्रौद्योगिकी की मदद से किसी भी सामग्री को हटाना और जोड़ना बहुत आसान है। अध्ययन का विश्लेषण संघों के बीच ई–संसाधन की लोकप्रियता और कार्यान्वयन के लिए सूचना प्रौद्योगिकी की आवश्यकता को दर्शाता है।

REFERENCES

1. Modi, Yogesh. Use of electronic resources by DRDO scientific community through consortium approach. DESIDOC, DRDO Science Spectrum, February, 2014, pp. 269-274.

2. Sharma, Vinod Kumari & Modi, Yogesh. E-journals service: cutting the barriers for accessing global S&T information with power of ICT. DESIDOC, DRDO Technology Spectrum, 2013.

3. Singh, Kunwar & Rao, V Bhaskar. An overview of the library consortia in India. 6th Convention Planner 2008. http://ir.inflibnet.ac.in/bitstream/1944/1124/1/10.pdf. [Accessed on 29 November 2014].

4. Nimbhorkar, S.P. Library consortia: benefits and models of E-journals consortia. *International Indexed and Refereed Research Journal*. April-May 2013. http://www.ssmrae.com/admin/images/ef4c727b0c2982fe74698f286abf94c6.pdf. [Accessed on 29 November 2014].

कृषि में ई–संसाधनों के लिए कंसोर्टियम
Consortium for e-Resources in Agriculture

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सारांश

नवंबर 2007 में स्थापित, कृषि में ई–संसाधनों के लिए कंसोर्टियम (सीईआरए के नाम से लोकप्रिय) आईपी प्रमाणीकरण के माध्यम से एनएआरएस में सभी शोधकर्ताओं, शिक्षकों और छात्रों, नीति नियोजकों, प्रशासकों और विस्तार विशेषज्ञों को कृषि और संबद्ध विज्ञान में चुनिंदा पत्रिकाओं के 24x7 ऑनलाइन पहुँच की सुविधा देने वाला अपनी तरह का पहला है। वर्तमान में, एनएआरएस में भारतीय कृषि अनुसंधान परिषद के संस्थानों, राज्य कृषि विश्वविद्यालयों, राष्ट्रीय अनुसंधान केन्द्र, परियोजना निदेशालय, आदि के सीईआरए में 143 सदस्य हैं। वहाँ दो डाटा बेस हैंय अर्थात, सीएबीआई और विज्ञान के वेब। एनएआरएस में ऑनलाइन प्लेटफॉर्म के बाद सीईआरए साहित्य की खोज के लिए षोध कर्ताओं द्वारा सबसे ज्यादा मांग में है। एक षोधकर्ता 80ः लागत में कटौती कर आसानी से अनुसंधान लेख पा सकता है। पिछले पांच वर्षों के दौरान, 50,000 से अधिक आलेख दस्तावेज डिलिवरी अनुरोध प्रणाली के तहत वितरित किये गये है। एनएएएस रेटिंग प्री–सीईआरए अवधि की तुलना में प्रकाशनों की गुणवत्ता में सुधार को दिखती है। विज्ञान वेब के माध्यम से किया विश्लेषण भी प्री–सीईआरए (2003–07) की तुलना में पोस्ट सीईआरए (2008–12) के दौरान प्रकाशित पत्रों की अधिक प्रशस्ति का भी संकेत देता है। इसको संक्षेप में कहे तो, सीईआरए कृषि अनुसंधान, शिक्षा और एनएआरएस संस्थाओं की विस्तार गतिविधियों में उत्कृष्टता प्राप्त करने, को बढ़ाने के लिए एक उत्प्रेरक की तरह कार्य करता है।

ABSTRACT

Established in November 2007, the Consortium for e-Resources in Agriculture (popularly known as CeRA) is the first of its kind for facilitating 24x7 online accesses of select journals in agricultural and allied sciences to all researchers, teachers and students, policy planners, administrators and extension specialists in NARS through IP authentication. At present, there are 143 members in CeRA comprising ICAR Institutes, State Agricultural Universities, National Research Centres, Project Directorates, etc. in NARS. About 3490 journals are now accessible in CeRA. There are two databases; namely, CABI and Web of Science. CeRA is the most sought after online platforms by researchers in NARS for literature search. A researcher can have easy accessibility to research articles with 80 per cent cost cut. During the past five years, more than 50,000 articles have been distributed under the Document Delivery Request System. The quality of publications measured through NAAS rating showed improvement from the pre-CeRA period. The analyses through Web of Science also indicate more citation of published papers during post CeRA (2008-12) than Pre-CeRA period (2003-07). To put it in a nutshell, CeRA acts like a catalyst to enhance agricultural research, education and extension activities of NARS institutions in achieving excellence.

Keywords: Access, Consortium, download, information, publication

1. INTRODUCTION

Information is a powerful tool for the development of society and is valuable for planning, directing, decision-making, motivating, and forecasting research and development activities to ensure productive and meaningful operation. 'Better information leads to better decisions' is a well-known saying and applicable in all walks of life. With the advancement of science and technology, the process of communication has expanded over the years to cover print and other modes like computer, mobile phone and associated gadgets.

India is predominantly an agrarian country, and the growth of agriculture is reflected in the good yields of different crops that depend on various factors - natural and manmade. Agricultural research, the backbone of agricultural growth in India, needs timely dissemination of the latest knowledge being generated and updated across the globe from time to time to all stakeholders. Knowledge generated is normally disseminated through

publications and audio-visual media. Publications comprise journals, research reports, bulletins, popular articles, books, monographs and newspaper articles made available offline and online. Of these, journals constitute an important part of a library collection as these are the most important vehicle for global scholarly communication. E-journals in libraries are currently getting a great deal of attention owing to distinct advantages over print journals [1].

1.1 Basic Features of e-Journal Consortium

A Consortium can be defined as "a strategic alliance of institutions having common interest" with the main aim to achieve what the members of the group may not achieve individually. Briefly, in a Consortium, a library or an agency works as coordinator for identification of member libraries along with resources to be covered and concerned publishers in the consortium. A committee appointed by the group will work out in detail the access mechanism, pricing models, payment mechanism, archival and copyright issues. Broadly speaking, there are two types of consortia, namely, Centralized consortia and Decentralized consortia. In decentralized consortia, members including the host of the consortia are loosely affiliated to one another or to the host. Decentralized consortia suffer from the exclusive staff and not institutionalized of its identity. Sustainability is better if the participating libraries are involved in decision-making and training is a continued process. The very terminology consortia call for collective management or governance. Accessing the electronic resources is infrastructure (IT) intensive and there is general lack of willingness to cancel the printed edition of the journals in the institution. One of the pre-requisites to remain in the forefront of international knowledge generation is the timely availability of journals[1,2]. Since no institutes/SAUs can subscribe to all journals and ICAR is having network connectivity across the Institutes and Agricultural Universities, CeRA was established for providing online accessibility of research articles from publishers through IP authentication (Fig.1).

1.2 Consortia Models and Guidelines

The consortia models are developed based on needs, purpose, scope of the consortia, common goals,
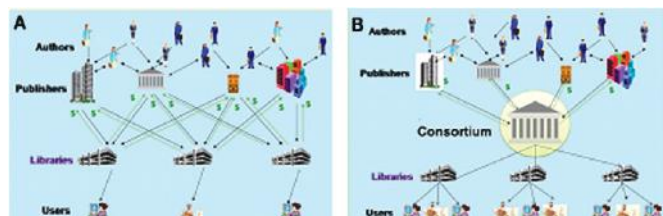
Figure 1. Schematic representations of (a) traditional model of information access and (b) consortium model of information access.

willingness of the targeted partners and projected outcome. Prior to developing a consortium, one needs to assess the strength and weaknesses of the existing products, types of access of libraries aimed on the use of bibliographic databases in the setup, available field and number of good bibliographic databases, the core collection of proposed participating libraries, constraints and level of users, the current spending level and what and where one can be saved through the consortium [3,4]. Thereafter, establish the consortium without putting too much pressure on deviation of budget. Consortia models have two important components, namely, consortia governance management model and resource management model [5-7].

Consortia guidelines pertain to consortia governance and management; consortia administration and operation; purchase and pricing of resources; access and licensing of resources; archiving and documentation; evaluation and statistical measures and information literacy and skill development. The following measures are helpful for setting up of a consortium and its smooth functioning and sustainability:

- Establish the emergence of online resources in relation to consortia;
- Establish the common protocols integrating to the existing services;
- Ensure safety in numbers (members) as a part of a consortium(larger and more diverse the consortium,
- Find common grounds between libraries and their vendors impact on the scope, functionality, and effectiveness of a library consortium; and
- Develop innovative partnerships between publishers / vendors and librarians.
- Setting up of National Coordination Committee for consortia (NCCC) for the development of suitable consortia models suitable for India taking into account of structure of academic, research and industrial structure, financial status, infrastructure and requirements of resources.

1.3 Establishment of CeRA

With the rapid growth of internet facilities and advancement of web technology, barring exceptions, all reputed international journals are available on-line and can be accessed by researchers over the network. In the early 2000s, Internet connectivity among NARS institutions (Institutes/Universities) was enabled under National Agricultural Technology Programme (NATP). Considering the rising exorbitant cost of journals and the geographical spread of the NARS institutions, it was decided by the National Agricultural Innovation Project (NAIP) to establish a consortium for the purpose of resource sharing, especially journals. Accordingly, proposal for establishing a consortium

for providing e-journal access in NARS was initiated at PIU, NAIP in the early 2007. After a series of discussion with the concerned experts, IARI was chosen as the Nodal Centre for establishing the consortium. Subsequently, the proposal submitted by IARI was reviewed and discussed at length and the Consortium for e-Resources in Agriculture (popularly known as, CeRA) was formally established. The broad aim of CeRA has been to facilitate round-the-clock online accessibility of Scientific Journals to all researchers/ teachers in NARS through IP authentication. Broad objectives of CeRA are:

• To upscale existing R & D information resource base of ICAR Institutions /Universities comparable to world leading institutions/organizations.
• To subscribe e-journals and create e-access culture among scientists/teachers in ICAR Institutes/ Agricultural Universities.
• To assess the impact of CeRA on the level of research publications measured through Science Citation Index& NAAS rating.

1.4 Research Achievements

Established in November 2007, the CeRA is first of its kind for facilitating 24x7 online accesses to select journals in agricultural and allied sciences to all researchers (teachers and students, policy planners, administrators and extension specialists) in NARS through IP authentication. CeRA is one in the club of five prominent Consortia in the country. The organizational structure, comprising Steering, Monitoring and Negotiations and Working Committees, was designed and functionalized to guideandhelp in smooth functioning of CeRA activities. The first CeRA website (www.cera.jccc.in) was launched in April 2008 and it has been revised two times, one in 2012 and 2014 (as www.jgateplus.com). CeRA is aimed to facilitate online accessibility of Scientific Journals to all researchers/teachers in NARS. The initial stage covered only four publishers and caters to 123 institutions in NARS. During the past five years, the CeRA members rose to 147 (including regional stations, KVKs and colleges). The number of publishers for subscription is increased to Seventeen. Currently more than 3400 journals are accessible in CeRA comprising, Consortium subscribed, Library subscribed and Open access journals.

1.4.1 Based on Downloads of Full Text Articles

The year-wise downloads of full text articles from journals available in CeRA have been compiled during the past five years. Accordingly, enhanced knowledge in different areas of agricultural research as revealed in the increased number of downloads of research articles from subscribed Journals in CeRA is

given in fig. 2. The year-wise increase in downloads are quantified and presented (Figure 3). Since 2008, CeRA member institutions have downloaded more than 80, 00, 000 articles till December, 2013.
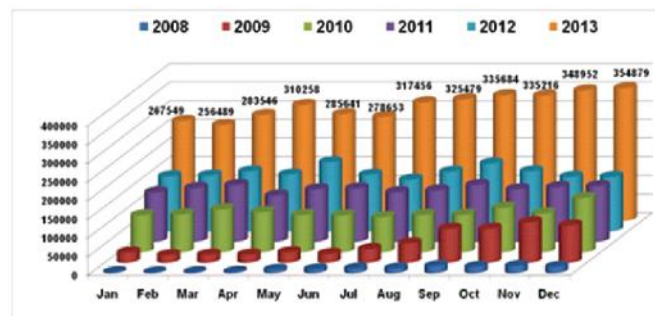
Figure 2. Month wise full text download of scientific articles in CeRA during 2008 – Dec.2013.

In the initial phase, only four publishers were subscribed in 2008 and 1, 27, 018 articles were downloaded (Fig.3).
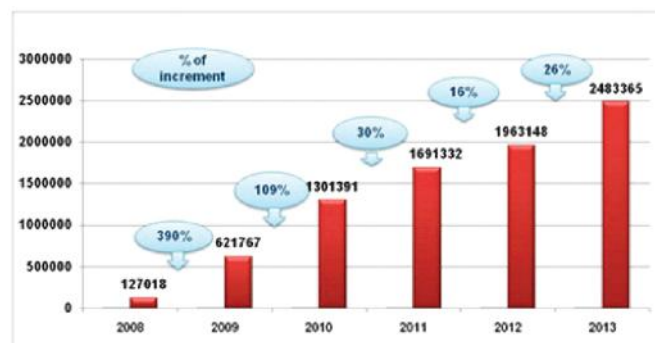
Figure 3. Year wise Full Text Download and % of increment of Scientific Articles in CeRA during 2008.

During the next five years, due to organization of sensitization programmes and addition of more publishers/journals in agricultural and allied subjects, there has been consistent increase in the number of downloads. In 2013, about 2045 journals from publishers have been made accessible besides open access and, more than 25,00,000 articles were downloaded in

Table 1. Year wise downloads of full text articles in the consortium

Year	Total Downloads	% of increment	No. of Subscribed Publishers
2008	1,27,018	-	4
2009	6,21,767	390%	6
2010	13,01,391	109%	6
2011	16,91,332	30%	5
2012	19,63,143	16%	7
2013*	24,83,365*	26%	14 (7 new Publishers from July 2013)
			*Only old publishers

the year 2013 (Table 1). The number of publishers being subscribed since the launch workshop in 2008 is presented (Fig.4).
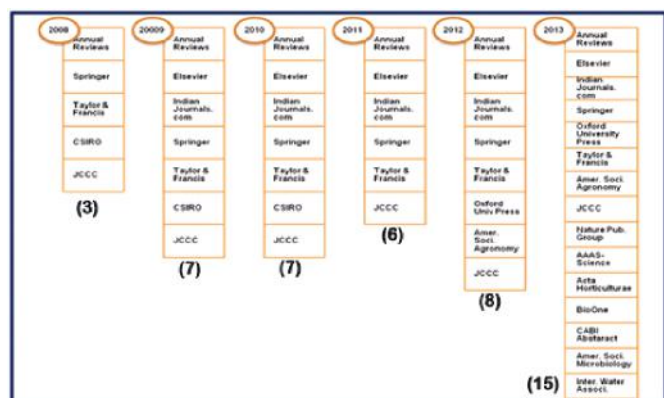
Figure 4. Year-wise subscription of publishers in CeRA during 2008 –2013.

Today, CeRA facilitates access to 3,000+ e-journals of all major publishers, citation and bibliographic databases. Apart from licensed resources, CeRA is also a single point entity that provides its users with access to a multitude of open access resources.

1.14.2 Based on NAAS Ratings

The data on research papers whose NAAS ratings during 2008 – 2012 have been collected and presented (Figure 5). It is observed that there is increase in the quantity and quality of research papers. Analyses indicate that the increase in the average number of papers with NAAS rating 2009 to 2012 respectively are (-) 3%, 13%, 8% and 17% vis-à-vis the publications in the previous year. The corresponding average NAAS rating are 1.75%, 1.78%, 1.75% and (-1.72%) respectively for 2009, 2010, 2011 and 2012. During the past four years (2009-2012), the average of annual increments is 8.75% for number of papers and 0.9% in respect of NAAS rating. Since NAAS rating has been modified on the scale of 0-20, analyses beyond 2012 was not carried out.
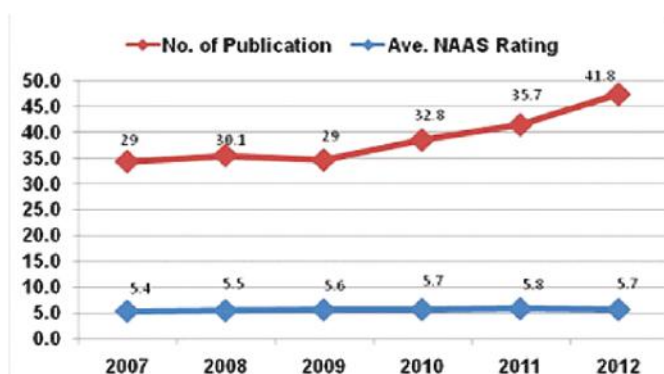
Figure 5. Impact of CeRA on Research Papers (based on data from 73 institutions in NARS).

Based on Web of Science: Research papers published and reported in Web of Science (from M/S Thomson Reuters) were analyzed during pre-CeRA (2002-2007) and post-CeRA (2008-2013) and presented (Figure 6). It is observed that in all cases, there is significant increase in the number of citations in post CeRA period indicating wide awareness of CeRA in NARS.
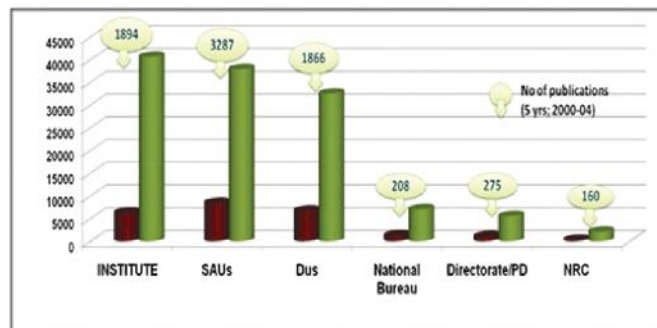
Figure 6. Impact of CeRA on research papers (based on data from 134 institutions in NARS).

4.   INNOVATIONS

Before CeRA, NARS libraries were independently subscribing required journals, most of which were subscribed through print/CDs besides not sharing subscribed resources though Document Delivery Service. This resulted in subscription to the same journal by different libraries. CeRA implemented a single search platform (http://jgateplus.com) for all available journals (3492) that includes subscribed journals (2046), library holdings (945) & Open Access Journals (501). Free Document Delivery Service has been implemented within CeRA member institution with mutual resource sharing concept. Through this service 85, 68, 021 online articles have been downloaded and 57, 743 out of 77, 016 requested articles have been sent though DDR service among CeRA member institution.

4.1. Remote Access Facility for Researchers

Fulfilling the dream of our visionaries and scientists, CeRA is providing remote access facility of subscribed resources (URL based http://14.139.56.75) outside campus on any device having assured internet connectivity. Remote access is a web based user authentication system. During 2013-14, this facility has been provided for Scientists of IARI, New Delhi. For convenience, the user authentication of this facility has been connected with IARI email server and researchers may easily maintain their login ID and password (which is their official email ID and password). Remote access facility has been appreciated by many researchers. These are illustrated (Figures. 7a, 7b and 7c).

4.2 Document Delivery Request System

Basic Features: Document Delivery Service was initiated in 1886.U.L. Rowell, the Librarian at the

University of California, Berkeley, sought permission to begin Interlibrary Loan and his request was granted during the years 1894-1898. In 1894 Rowell started U.C. Berkeley's first program of interlibrary lending, with the California State Library as partner. Later that year Rowell expanded the invitation for a group of libraries, such as NUCMC (National Union Catalog of Manuscript Collections.). Librarians then filled out a standardized form (i.e. an ALA Interlibrary Loan Request Form 2002) and sent it by postal mail to a library that owned a copy (Fig. 8).

Benefit of DDRS: Document Delivery Service provides various benefits to consortia users in many ways. Some of them are:

• It is space and time invariant.
• Helps save time for users.
• May help researchers to enhance publication of research papers.
• Cost saving.
• Sharing of print resources.

4.2.1 Document Delivery Request System in CeRA

Document Delivery Request (DDR) Service is an innovative part of CeRA, which is providing the research article from a journal which is not subscribed by CeRA, but which is available in the library of a CeRA member institution. Researcher can get such an article online or offline from the CeRA member library who subscribes the journal. The indenting researcher can get such an article online or offline

Figure 7. Sequence of steps for remote access in CeRA.

Figure 8. A model of DDRS format available in CeRA.
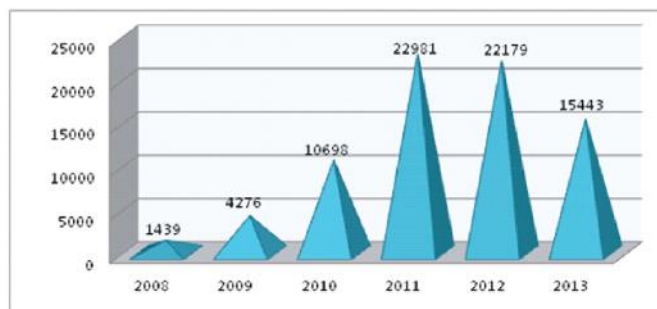
Figure 9. Receive requested article in CeRA.

from the CeRA member library who subscribes the journal. The authorized user in a CeRA member institution can have this facility. The online format available in CeRA website is shown (Figure 9). The researcher has to fill up all mandatory information and click the 'submit' button so that the request is sent to the concerned library for a response under DDRS.

DDRS facility in CeRA was made effective since its launch in April 2008.The format shown in Fig. 10 was revised at least four times in the light of discussion/feedback from researchers during the past five years. During the past six years (2008-13) more than 77,016 articles have been distributed among researchers in NARS under DDRS.

4.2.2 Distribution of Articles among CeRA Members under DDRS

The data on research papers which are distributed among CeRA members under DDRS during 2008 – 2013 have been collected and analyzed. It is observed that the rapid increase in the number of articles distributed among members of CeRA under DDRS till 2011 showed a gradual decreasing trend during 2012 and 2013. This is partly because of awareness and partly because more and more publishers have been chosen for subscriptions during 2012 and 2013.

5. CONCLUSION

Consortium for e-Resources in Agriculture (popularly known as CeRA) is an e-journal Consortium facilitating 24x7 online access of select agricultural journals to all researchers in NARS through IP authentication.

There was no doubt that the use of e-journals through CeRA was expanding rapidly while allowing the rapid distribution of information at reduced cost. The ultimate objective of CeRA was the utilization and exploitation of information that raised levels of research and education and simultaneously strengthened community links and stimulated participation in research for development of NARS system. Now the member libraries had less pressure on space requirement for storing and maintenance of print-based scientific journals. The data collected from the survey showed a growing interest in electronic journals among the researchers in NARS System. Furthermore, it seemed that module of training session should be conducted which would be used by librarians for their concerned institutes users. Also, the librarians and information services personnel had a challenge to increase its information giving character in providing this information to the end user to enable them to most effective and most efficient use of e-journals facility being offered by CeRA. Looking to the future, CeRA envisages incorporating the system into more facts of its e-journal work, particularly in the area of usage statistics. In the coming year also, planning to increase the awareness among the CeRA members so the full potential could be utilized. CeRA has made a positive impact on the minds of the R&D community of NARS system. Many libraries now are requesting for enhancing the coverage of journals by adding publishers like Wiley-Blackwell, Oxford University Press, and American Society of Agronomy etc.

निष्कर्ष

कृषि में ई–संसाधनों के लिए कंसोर्टियम (सीईआरए के नाम से लोकप्रिय) आईपी प्रमाणीकरण के माध्यम से एनएआरएस में सभी शोधकर्ताओं को कृषि में चुनिंदा पत्रिकाओं के 24X7 ऑनलाइन पहुँच की सुविधा देता है। इसमें कोई शक नहीं था कि कम कीमत पर जानकारी का तेजी से वितरण की अनुमति मिलने के बाद भी सीईआरए के माध्यम से ई–पत्रिकाओं का उपयोग में तेजी से विस्तार हो रहा था। सीईआरए का आखिरी उद्देश्य जानकारी का उपयोग और समुपयोजन करना था जो अनुसंधान और षिक्षा के स्तर को उठा सके और एनएआरएस प्रणाली के विकास के लिए समुदाय लिंक को मजबूत बनाने के साथ साथ अनुसंधान में भाग लेने को प्रेरित करना था। अब पुस्तकालयों के सदस्य पर प्रिंट आधारित वैज्ञानिक पत्रिकाओं के रख रखाव और भंडारण के लिए स्थान की आवश्यकता के लिए कम दबाव था। सर्वेक्षण से एकत्र आंकडे एन एआ रएस सिस्टम में शोधकर्ताओं के बीच इलेक्ट्रॉनिक पत्रिकाओं में एक बढ़ती रुचि को दिखाते थे। आगे, यह दिखाता था कि प्रषिक्षण सत्र के उस मॉड्यूल को आयोजित किया जाना चाहिए जो उनके संबंधित संस्थान उपयोगकर्ताओं के लिए पुस्तकालयाध्यक्षों द्वारा उपयोग किया जायेगा। इसके अलावा, पुस्तकालयाध्यक्षों और सूचना सेवाओं के कर्मियों को जानकारी प्रदान करने वाले चरित्र को बढ़ाने के लिए एक चुनौती थी जिससे वे उपयोगकर्ता को जानकारी प्रदान कर सके और सी ई आर ए द्वारा पेश की जा रही ई–पत्रिकाओं की सुविधा के सबसे प्रभावी और सबसे कुशल उपयोग के लिए उन्हे सक्षम बना सके। भविष्य के लिए, सीईआरए विशेष रूप से उपयोग आंकड़े के क्षेत्र में, अपने ई–जर्नल कार्य के अधिक तथ्यों को प्रणाली में शामिल करने की कल्पना करता है। आगामी वर्ष में भी, सीईआरए सदस्यों के बीच जागरूकता बढ़ाने की योजना बना रहा है जिससे पूरी क्षमता का उपयोग किया जा सकता है। सी ई आर ए ने एन आर एस प्रणाली के अनुसंधान एवं विकास समुदाय के मन में सकारात्मक प्रभाव बना दिया है। कई पुस्तकालयों अब विले–ब्लैकवेल, ऑक्सफोर्ड यूनिवर्सिटी प्रेस, और कृषि विज्ञान की अमेरिकन सोसायटी आदि के प्रकाषकों को जोड़कर पत्रिकाओं की कवरेज बढ़ाने के लिए अनुरोध कर रहे हैं।

REFERENCES

1. Chakravarty, Singh. E-Resources for Indian Universities: New initiatives. SRELS
2. Visakhi. Consortium for e-Resources in agriculture. DESIDOC J. Lib. Inf. Tech., 2009, 29(5), 24-30.
3. Moorthy. DRDO E-Journals Consortium. DESIDOC J. Lib. Inf.Tech.,2009, 29(5),18-23.
4. http://delcon.gov.in
5. http://ejournal.niscair.res.in/index.phphttp://ejournal.niscair.res.in/index.php
6. http://paniit.iitd.ac.in/indest
7. http://www.ncra.tifr.res.in/library/forsaweb/index.htm
8. http://www.nmlermed.in

प्रकाशनः नई प्रौद्योगिकीय परिवर्तन
Publishing: New Technological Changes

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सारांश

प्रकाशन में हुए विकास को रेखांकित किया गया है। इलेक्ट्रॉनिक प्रकाशन, ई—जर्नल, ई—बुक, ई—मैगजीन, ई—समाचारपत्र, डेटाबेसों के संदर्भ में इसकी विशेषताओं और लाभ पर ध्यान केन्द्रित किया गया है। ई—फार्मेट और युक्तियों, अधिग्रहण मुद्दों, और प्रकाशन की प्रक्रिया की भी विस्तृत व्याख्या की गई है। डीआरडीओ की स्थापना, ई—जर्नल सेवा, प्रकाशन, डीईएसआईडीओसी में पूर्व और वर्तमान की प्रकाशन सुविधाओं को प्रस्तुत किया गया है। नवीनतम स्मार्टफोनों, एप्स स्टोरों, मोबाइल युक्तियों पर इंटरनेट, एमकॉमर्स की स्थापना, टैबलेट मोबाइल इत्यादि के साथ परिवर्धित वास्तविकता (ऑग्यूमेन्टेड रियल्टी) ही प्रकाशन का भविष्य है।

ABSTRACT

In this paper the development in publishing is highlighted. It focuses on electronic publishing its features and advantages with reference to e-journals, e-books, e-magazines, e-newspapers, databases. E-book formats and devices, acquisition issues, and process of publishing are also elaborated. The establishment of DRDO E-journal service, publishing, the past and present of the printing facilities in DESIDOC is presented. Future of publishing is augumented reality (AR) with latest smartphones, apps stores, internet on mobile devices, establishment of mCommerce, tablet mobile, and so on.

Keywords: Augumented reality, mCommerce, e-journals, e-books, e-magazines, e-newspapers

1. HISTORICAL BACKGROUND[1]

Publishing depends on writing, paper and printing. Writing numbers for record keeping was started before writing of language. Writing of language was invented in Mesopotamia and Mesoamerica. And writing systems were invented in Egypt and China. In the early days writing was done by engraving on stone or metal. Later on plaster (gypsum) was used along with stone. In Egypt with the invention of papyrus, the writing spread and it was in great demand in the different parts of the world. Later Parchment sheepskins after the removal of the wool was also used for writing. In 1040 china developed the World's first movable type printing technology. Johannes Gutenberg improves movable type printing in the year 1450 and in 1456 the bible becomes the first book printed in a press anywhere in the world. World's first magazine was published in the year 1731 in London. With invention of the camera in the year 1790 and in 1796, the invention of Lithography printing of high quality images was possible. Photojournalism flourished in the year 1847. Invention of linotype machine saw typesetting and reduction in labour. Early nineties saw the four colour rotary press and offset lithography. The mid nineties marked the internet revolution. Late nineties saw the introduction of Aldus pagemaker software, the desktop era. The digital era begins with the development of online versions of newspapers, self publishing, google on the internet, facebook & twitter which has become a hub of information dissemination. The changes in publishing is seen at the end of the 20th century. New technologies have transformed the processes of publishing and distribution. It has made it competitive, commercial and technology driven. The different publishing models evolved are e-journal, e-books, e-magazines, e-newspapers, databases, etc.

2. E-PUBLISHING FEATURES AND ADVANTAGES

Some of the e-publishing features are:

- Faster search ability
- Restricted usage-only to those who are authorised
- Have link ability to, from, within, and between text
- Improves services of information centre
- Help in collection buildup by providing accurate statistics

- More interactive and customised
- Can navigate to specific sections/chapters
- Anyone can search for text, bookmark pages, add highlighting text and notes
- Zoom in and out
- Save and Print pages
- Sometimes require Adobe reader or free flash player
- Interactive glossary
  Some of the advantages are:
- Save users' time
- Read by multiple readers
- Do not get lost or stolen
- Easy searching
- Some cost saving or more titles for same cost
- Reduced shelving and binding cost
- One can get it immediately on desktop by downloading
- They need less space for storing
- They are portable, either one can carry a whole library of books on a CD, laptop, notebook
- Easy access to more information
- Interactive, audios, videos, and animations enhance the message that the author is trying to convey
- Anywhere, anytime access possible
- There is no packaging and shipping expenses

3. E-PUBLISHING MODELS

3.1 E-journals

A journal is the primary source of information and is a scholarly publication that is peer reviewed. It is generally a regular publication either monthly, quarterly, biannually or annual. Articles are written by professionals/experts/scholars in a particular field. Content is presented in detail, research studies, with bibliographies and references, and language is technical. It can be used for current research findings, checking facts or data, and reviewing the important research on a specific topic. Books are secondary source of information which are materials that digest, analyze, evaluate and interpret information contained in the primary source or other secondary sources and are generally used for an overview on a subject. E-journal is a primary source of journal which can be accessed via electronic transmission, i.e., they are published on the web. They provide information for research and other studies. Some e-journals are online-only, some are online versions of printed journals, and some are available both in the printed as well electronic form or online.

3.1.1 DRDO E-journals Service

This service was started w.e.f. 1 January 2009 covering 7 publishers – American Computing Machinery (ACM), American Chemical Society (ACS), AIAA, Elsevier, IEEE, Janes, Science and one service provider

J-Gate Custom Content for Consortium (JCCC) covering 455 subscribed e-journals (Fig.1).

Later on other publishers are added in 2010 Nature Publishing Group (NPG) with one journal *Nature*, in 2012, two publishers, American Society for Mechanical Engineers (ASME) and Taylor & Francis group were added. The DRDO E-journal Consortium facilitates sharing resources and improving access to information. The resources are shared among the DRDO libraries that have common goals and interests. Access increased during 2014 with the implementation of Open Athens (Anywhere, Anytime access). Open Athens is an access and identity management service based in the US that is supplied by Eduserv to provide single sign-on to protected resources.

3.2 E-Books

It is an electronic/digital version of a book designed to be read on a PC or an e-book reader. E-books have started in the early 1960s. Project Gutenberg was
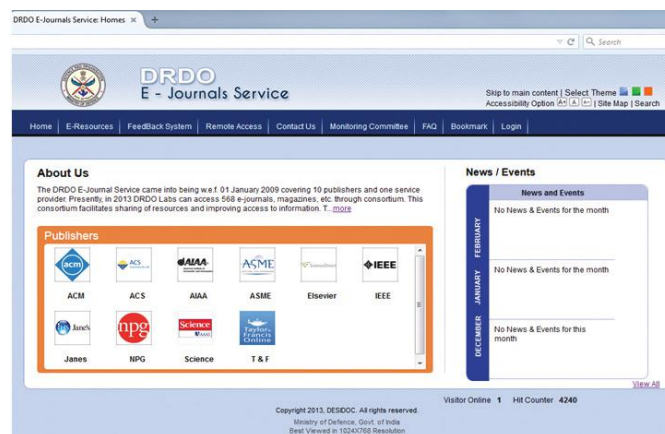
Figure 1. DRDO E-journal service.

launched to create copies of books.[2] Early e-books were created for specific subjects and particular reader or interest groups. The books were generally technical manuals, etc. E-book can be published in a variety of formats. PDF and ePUB are the most common e-Book file formats. PDF was created by Adobe in 1993 and used for special interest books. Pdfs allow the publishers to create more intricately designed books, with fixed page numbers and illustrations, but may be difficult to read on some e-readers and other devices, especially those with small screens. ePUB is generally used for mass market books and the files do not have the fixed page numbers. E-books are usually read on dedicated e-book readers or tablets using e-reader applications. Personal computers, laptops, mobile phones (smart phones) can also be used to read e-books.

3.2.1 E-book Devices[3]

- *Desktop & Laptop computers:* E-books can be used

or read on desktop or laptop based on the file format. They are generally PDF (.pdf) or epub(.epub)

- *Digital Audio Players:* Audio books can be used on these devices. The most compatible formats is MP3(.mp3) files. Other audio files are AIFF(.aiff), OGG (.ogg), and WAV(.wav)
- *E-readers:* e-readers are able to download, store and read e-book.
- *Handheld Mobile:* They are Android, BlackBerry and iPhone which can be used for ebook access.
- *Tablets:* They are iPad and Xoom, can be used as ebook reader.

3.2.2 E-readers[3]

- *Amazon Kindle* – It is a dedicated e-reader designed for e-books only. Uses a proprietary format with DRM. Kindle Direct publishing program automatically converts any type of formats used for uploading into its proprietary, DRM-locked format.
- *Apple iPad* – It can be used as an e-reader via apps which have the ePub(.ePub) and PDF(.pdf) formats. iPad can also be used for reading ebooks designed for the Kindle, Nook, and other devices.
- *Barnes & Noble Nook* – It is a dedicated reader only for e-books. ePUB format is compatible with this reader.
- *Sony Reader* – It is available in various sizes. The formats supported are ePUB (.epub) and PDF (.pdf). Can also be used to display JPEG files.

3.2.3 File Formats[3]

The various file formats are as follows

- Audio Interchange File Format (.AIFF) – This is an audio format compatible with Apple devices
- Amazon Kindle Format (.AZW) – This is a custom format for Kindle e-reader only
- Digital Accessible Information System Format (DAISY) – Text and audio enabled format. Can only be used on standalone, standard digital audio players.
- DOC – document file format published as .doc, DOCx is a document file format
- DJVu format (.DJVU) – This is used for high resolution documents.
- Electronic Publication Format (.EPUB) – Designed for re-flowable content, that is the text will adjust to the device's screen size. epub texts do not support images or embedded content such as equations. It has gained popularity as a vendor independent. EPub is written in XML and XHTML. Platforms already using XML can be easily converted to EPUB.
- Hypertext Markup Language Format (.HTML)
- Mobipocket Mobile Format (.MOBI) – Amazon format compatible with mobile devices.
- MPEG Layer 3 Format (.MP3) – An audio file format compatible with most digital audio players
- Portable Document Format (.PDF) – Most commonly used format which have fixed layout, may not be suitable for very small screens that come with some readers and smartphones. Pdf files give control on layout and fonts
- PostScript published as.ps
- RTF published as.rtf
- Plain Text File Format (.TXT) – Not compatible with dedicated e-readers
- Waveform Audio File Format (.WAV) – Audio format used in IBM and Microsoft computers.

Table 1. Comparison of some of the file formats[4]

Format	Extension	DRM support	Image support	Table support	Sound support	Interactivity support	Word wrap support	Open standard	Embedded annotation support	Book marking
Plain text	.txt	No	No	No	No	No	Yes	Yes	No	No
HTML	.html	No	Yes	Yes	No	No	Yes	Yes	No	No
PostScript	.ps	No	Yes		No	No	No	Yes		
Portable Document	.pdf	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
DjVu	.djvu		Yes	Yes	No	No	No	Yes	Yes	Yes
EPUB	.epub	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fiction Book	.fb2	Yes	Yes		No	No	Yes	Yes	Yes	
Mobi pocket	.prc, .mobi	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Kindle	.azw	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes
E-reader	.pdb	Yes	Yes		No	No	Yes	No	Yes	Yes
TealDoc	.pdb	Yes	Yes		No	No	Yes	Yes		Yes
Multimedia Ebook	.exe	Yes	Yes		Yes	Yes	No	Yes	Yes	Yes

Most of these formats support digital rights management (DRM), image, table, sound, interactivity, word wrap, open std, video, book marking, etc. Supporting platform vary from one format to the other. E-books have made self publishing or print on-demand possible shown on Table 1.

3.2.4 E-book Acquisition Issues[5]

DESIDOC has planned to setup DRDO E-book Service from different publishers based on the needs for all the DRDO scientists/officers. Some of the points to be considered while developing e-book collection can be grouped as follows:

- Business Model: What type of business model; No. of simultaneous user allowed; perpetual access right; pattern of costing; consortium deal; volume purchase discounts; and many more
- Licensing: Allow upload and reproduction of parts; allow interlibrary loan; access to readers anywhere anytime; permission to archive for continual access; does the supplier deposit material in CLOCKSS (controlled LOCKSS - a dark archive for the preservation of web-based scholarly publications).
- Technical Issues: Access route; software required for access of ebook; search system; use of mobile e-book reader; exporting facility; support through e-mail.
- Collection Management Issues: Appropriate subject coverage and level; individual title selection mechanism; upto date information (latest editions); compatible formats; updation frequency; information of addition/deletion.
- User Interface: Systematic and clear organisation; access and navigation; easy and advanced search; appropriate colour and graphics; easy downloading/ printing facility; compatible with screen readers/ software; online help; bookmark, highlight and share, etc.

DESIDOC has also created e-books of all the monographs published by DESIDOC in pdf and epub format which have been loaded on the intranet.

3.3 E-Newspapers[6]

A newspaper has an important role in dissemination of current information to its readers. Major newspapers contents are published on the web along with the paper version of the same.

E-newspaper is the electronic version of a traditional newspaper and searches from the online databases. E-newspaper types are (a) online newspaper, (b) pdf newspaper and (c) e-news. The difference between each one is that in online/web newspaper, the navigation, support, advertisement, etc., are available online on the web. Pdf newspaper is the replicas of the print versions in the pdf format. E-news services provided with the help of e-devices.
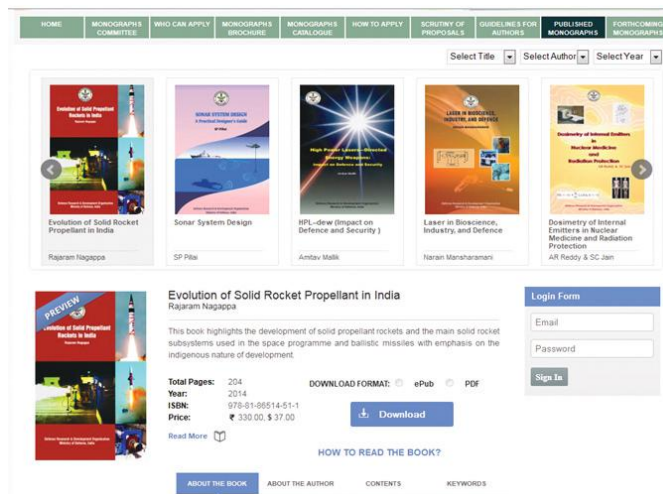
Figure 2. E-books – Monographs published by DESIDOC.

Figure 3. List of electronic editions of Indian newspapers.

3.4 E-Magazines

Magazines titles like *India Today*, *Frontline*, *Outlook*, *The Week*, and many more have established online versions on the web.

3.5 E-Databases

The holding of a library database consists mainly of books, periodicals, reports, etc., which are converted into electronic form with access facility on the digital network. Example is the OPAC which shows that information could be published and could be searched with the author, title, subjects. There are two types of databases, the full-text and the bibliographic.

EBSCOhost Database: Range from subject-specific to general; Proquest database include citations and full-text articles from a variety of databases; and Web of Science & Scopus database includes abstracting and indexing databases and used to rank journals in terms of their productivity and the total citations received to indicate the journals impact shown on Fig. 4.

blind (Reviewers identity implicit from the author, reviewers knows the identity of the writer or double blind (Both remain unknown to each other). Based on the reviewers' comments the editor makes the decision. The manuscript may be accepted with minor or major revisions or rejected. (A database of reviewers is maintained online).

- Communication with the author regarding the

Figure 4. Homepage of databases: Proquest, Scopus, and Web of Science

4. PUBLISHING PROCESSES

Major steps involved in publishing are as follows:

- Material for publishing: It is important for the author to consider some of the points while selecting a publication
  - ✓ Journal finder tool
  - ✓ Check for the aims and scope of the particular publication
  - ✓ Follow the guidelines for that particular publication
  - ✓ Submit only one manuscript at a time
- Submission of manuscript to the editor: These days electronic submission of manuscript has made this step very simple.
- Editing
  - ✓ Substantive editing: Starting from the structure, organisation, logical, consistency, illustrations, bibliography, notes if any, index may be required and any other element.
  - ✓ Copy editing: This is done to check inconsistencies in the text, i.e., from punctuations to facts and figures, correct grammer, spellings, reference style, implementation of house style
  - ✓ Proof reading with reference to the editing ie grammer and style; punctuations; spelling errors and word usage.
- Online Reviewing Process: The editor sends the manuscript to the two or three subject experts/ reviewers. Type of review can generally be single

corrections/revision of manuscript (First draft) for amendments by the author.
- Revision by the author if the manuscript is accepted
- Design and Typesetting – Designing of the cover page, book jacket which is an important factor.
- Proof reading – Check the second proof in electronic pdf format. Last chance to make amendments before it goes to press
- Indexing if required
- Printing
- Sales
- Marketing: It is the process of planning and executing, pricing, promotion, and distribution of ideas, goods, and services to create exchanges that satisfy organisational objectives. Promote through book trade and the academic market, by flyer or other promotional materials shown on Fig. 5

4.1 Open Journal Sytem (OJS)

These days OJS is being used for journal publishing developed by Public Knowledge Project. This assists in all the stages of the refereed publishing process. It is an open source software available freely for making open access publishing possible. Some of the main features are it can be installed and controlled locally, editors can configure review process, online submission, comprehensive indexing, e-mail notification, etc. OJS helps in reducing the time taken for evaluation of the manuscript. The author can use search option to find any of the paper or material (Fig. 6).
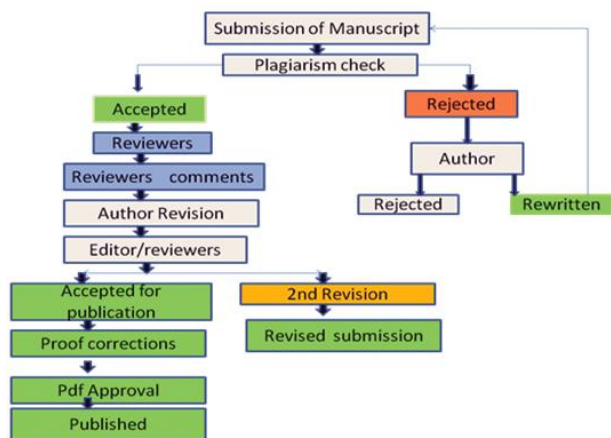
Figure 5. Publishing processes.
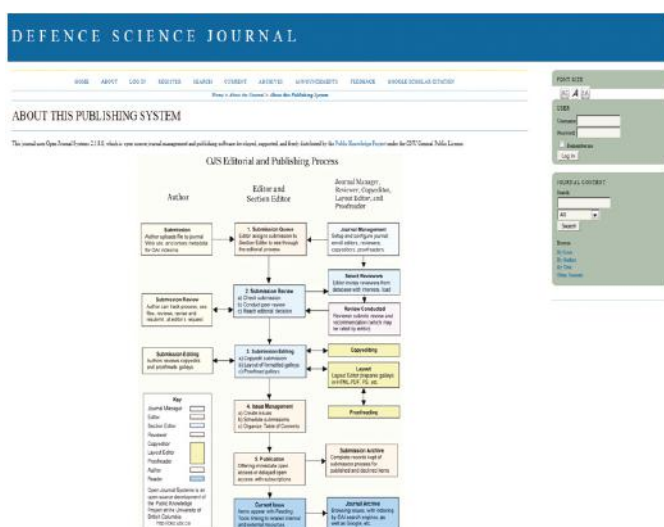
Figure 6. OJS System – DSJ at DESIDOC.

5. ROLE OF DESIDOC IN PUBLISHING

Defence Scientific Information and Documentation Centre (DESIDOC) is a centralised publishing wing of DRDO. To disseminate current information on research and development activities being carried out by various DRDO labs/estts. DESIDOC brings out regular publications. A number of special publications are regularly brought out by DESIDOC. Planning, organisation, collection, compilation, editing, proof checking, and finally printing and uploading are the steps being followed. DESIDOC publishes the following regular publications

- *Defence Science Journal*: It is a peer reviewed, open access, bi-monthly, primary research journal in the area of defence science & technology. The abstracting and indexing sources are Science Citation Index, chemical abstract, Google Scholar, DOAI, Indian Science citation index and many more. The Journal is published in printed form as well as on the web http://publications. drdo.gov.in/ojs/index.php/dsj in the electronic form. Full-text available both in HTML and PDF format. DESIDOC has implemented OJS for DSJ.

- *DESIDOC Journal of Library & Information Technology*: It is an peer reviewed open access Journal in the area of Information Technology as applicable to library and information Science. It is useful for the librarians, documentation and information professionals, students and others interested in this area. The abstracting and indexing sources are Scopus, DOAJ, Indian Science citation index, Indian Science Abstract and many more. The journal is published in printed form as well as on the web http://publications. drdo.gov.in/ojs/index.php/djlit in the electronic form. Full text available in PDF format. DESIDOC has implemented OJS for DJLIT.

- *DRDO Newsletter*: It is a monthly house bulletin of DRDO. It covers the latest developments in DRDO, important activities, manpower development activities, patents obtained, visits, achievements, personnel news, appointments, promotions, superannuation, awards, raising day of labs, scientific meetings/workshops/ conferences organised, Hindi related activities, etc. The newsletter is published in printed form as well as on the web http://drdo.gov.in/drdo/English/index. jsp?pg=newsletter.jsp in the electronic form. The Hindi version DRDO Samachar is also available in print as well as online at http://www.drdo.gov.in/drdo/English/ index.jsp?pg=samachar.jsp. Full-text is available in PDF format.

- *Technology Focus*: This publication brings out the technological developments in DRDO. It is a monthly issue. The focus is intended to project DRDO achievements in terms of products and technologies in their proper perspective for prospective customers and other interested both in the country and abroad. It is aimed to build a vibrant image of DRDO in the public. The Hindi version *Prodhyogiki Vishesh* is also brought out regularly. The focus is published in printed form as well as on the http://www.drdo.gov.in/drdo/pub/ techfocus/2014/TF_June_2014_WEB.pdf. Full-text available in PDF format.

- *DRDO Science Spectrum*: This is annual publication covering the articles written by selected scientists of DRDO labs on the occasion of National Science Day. This publication is available in print as well as on intranet. Full text available in PDF format.

- DRDO Technology Spectrum: This is annual publication covering the articles written by selected scientists of DRDO labs on the occasion of National Technology Day. This publication is available in print as well as on intranet. Full text available in PDF format.

5.1 Printing Facilities at DESIDOC

In the year 1961, a printing press with letter Press unit was established. Then only hand written manuscripts with free hand drawings were received from the authors. Photographs were processed in

another division of DESIDOC. Equations, symbols were composed on wooden blocks for printing. Proof reading and carrying out corrections was an elaborate and difficult process. Mechanisation of this activity started in early 80s by updating the facilities with Rota Print, Romoyer, Swift Offset printing machine, Varytype and Network typewritters, IBM electric composers with builtin memory, use of pre-sensitised plates and swift offset machines. Further steps were taken to modernise the printing facilities with importing Dominant and Heidelberg machines. The CR Tronics computer-based phototypesetting machines and a Climisch camera were imported to improve further. These facilities have helped in bringing out publications on time with better quality. At present, DESIDOC has latest printing Technology including computer-to-plate and digital printers and has the technical set-up/facilities for preparation of positives, pre-sensitised plates as well as Metijet printing plates and single colour offset printing. It is equipped with Deskpro 9880 computer-to-plate (CtP) system for preparation of CtP plates, and Xerox J75 Digital printer. The binding facilities are paper folding machine, paper cutting machine and stitching machine.

6. FUTURE OF PUBLISHING

The process of publishing and distribution has changed due to the technological developments. Electronic publishing is important in the digital era. We can see that the publishing has a direct impact on the library and information services being offered by an information and documentation centre.

Changes in publishing have affected the relationships between ie the authors and publishers and agents/ aggregators, between publishers and librarians and between publishers and readers. Some of the new trends are:
- We can also see how print publishing will be less as compared with electronic publishing in the years to come.
- In the area of e-journals, there is a lot of improvement in the access with the implementation of Open Athens anywhere anytime access-DRDO e-journal service.
- But in case of e-books, we need to look into a number of issues like pricing patterns, growth and standards, evaluation of e-books/e-book collection, consortium, e-publishing related issues etc as we need to implement e-book service too.

- The role of editors will continue because no computer can replicate the role and work of an experienced editor until machines similar to brain are invented.
- About metadata, it would be important for the librarians and semantic analysis would be important for the users, as users/readers would not be searching on metadata but the core subject.
- Pdf is used when the end product is only print. The format to be used today are based on technologies like html to allow interoperability between various platforms.
- Sell the book first and then print, which reduces cost, eliminates wastage and improves return. One retains the rights with self publishing.
- Ambiguity exists about the publishing platform, products and technologies.
- Last but not least is Augumented Reality (AR) in publishing[7]. AR is not equal to print + digital, or when the whole is more than the sum of the parts. The different features of AR are bidirectional and circularity communication, contents are not static, interactive, multi-mediality and cross-mediality. AR closes the gap between the digital world and real world. The key factors which will help to adopt AR in publishing are latest smartphones, apps stores, internet on mobile devices, establishment of mCommerce, tablet mobile, etc. Goals of AR in publishing are promote marketing and functional goals.

REFERENCES
1. http://www.mediabistro.com/galleycat/timeline-a-brief-history-of-publishing_b79150 (accessed on December 2014).
2. http://en.wikipedia.org/wiki/E-book (accessed on December 2014).
3. http://www.loc.gov/rr/program/bib/ebooks/devicesformats.html#ereaders (accessed on December 2014).
4. http://en.wikipedia.org/wiki/Comparison_of_e-book_formats (accessed on December 2014).
5. E-books in libraries a practical guide edited by Kate Price and Virginia Havergal, 2011 (accessed on December 2014).
6. http://www.advertisementindia.com/ePapers.aspx (accessed on December 2014).
7. http://www.inglobetechnologies.com/docs/whitepapers/AR_printing_whitepaper_en.pdf (accessed on December 2014).

विज्ञान एवं प्रौद्योगिकी संगठन के लिए प्रकाषन सॉफ्टवेयर का चयनः अतीत और वर्तमान के रुझान
Selection of Publishing Software for S&T Organisation: Past and Current Trends

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सारांश

विज्ञान और प्रौद्योगिकी प्रकाषनों को विषिष्ट सुविधाओं के एक सेट द्वारा चिह्नित किया जाता है, जिनमें पाठ, तालिकाएं, चित्र, वेक्टर चित्र, और समीकरण षामिल हैं। बदलती परिस्थितियों में पिछले दो दषकों के दौरान डेसीडॉक में इस्तेमाल किए गए कई सॉफ्टवेयरों के गुण और दोश पर चर्चा की गई है।दस्तावेज प्रिंट तैयार करने के लिए प्रकाषन के सभी तत्वों को कम्पोज करने के लिए कई सॉफ्टवेयरों के एक संयोजन का इस्तेमाल किया गया है। कोई भी अकेला प्रकाषन सॉफ्टवेयर मुद्रण के लिए दस्तावेज को तैयार करने के सभी तत्वों को प्रसंस्कृत नहीं कर सकता। यह षोधपत्र प्रकाषन की लगातार बदलती जरूरतों के लिए तैयार करने में पिछले 20 वर्शों में संगठन में कार्यरत डीटीपी और प्रेस–पूर्व प्रक्रियाओं के रुझानों को बताता है साथ ही चयन, उपयोग, उन्नयन और एक बड़े संगठन में ग्राहक की आवष्यकता को प्रभावित करने वाले अन्य संबंधित कारकों पर भी चर्चा करता है।

ABSTRACT

Science and technology publications are marked by a set of typical features that include text, tables, images, vector diagrams, and equations. Many software used in DESIDOC during past two decades are discussed under the varying circumstances highlighting the merits and demerits. A combination of many software were used to compose all the elements of the publication to make the document print ready. No single publishing software can process all the elements to prepare the document for printing. The paper brings out trends in DTP and pre-press processes employed in the organisation over past 20 years in to prepare for the constantly changing publishing needs while factoring in other related factors influencing selection, usage, upgradation and client requirement in a large organisation.

Keywords: DTP software, pagemaker, indesign, coreldraw, photoshop, microsoft word, wordstar, software selection, DTP training

1. INTRODUCTION

Sharing of information, and knowledge through various media is an age-old practice among the human kind. The written script has played a major role in preserving knowledge of previous generation and passing on to the next generation. After invention of printed type, there has been marked acceleration in volume of information generated, its accumulation and re-circulated. The further helped in laying a basis for further research in the required field and gaining further knowledge. The process of generation of a printed book for mass reading was a very difficult and tedious task as evidenced by publications brought since Gutenberg press1 using moving type. As industrial age progressed and many machines were brought into moving type technology, the printing of book became easier. The placing of type character by hand into holding frame to form words and paragraphs still was the most common form of composition well into mid 20th century and continues to date in some countries. The process of book publishing can be segregated into content creation, editing and design (pre-press), printing, and marketing or distribution activities. In this article, the focus is on changes brought into prepress activity in the past few decades due to technological changes, impact of user preferences, and market needs. The advent of PC and Mac brought about a sea change in speed of publishing books and mass propagation

of creation of documents by shortening the process of editing, designing and composing using software in both Mac and IBM computers. Many software packages were launched and publishing houses based on their needs, adopted some and rejected some when a better option was available. Gradually, some of them became ubiquitous and some became specialised and others simply faded away.

2. TYPES OF PUBLISHING

We can focus on types of publishing based on the type of users. The first type includes mass market books, both fiction and non-fiction. The second is children's books evidenced by large format, colourful and containing illustrations. The third type is Journals, academic, reference, scientific and technical (S&T), and medical publishing.

3. PUBLISHING SCENARIO AT DESIDOC

DESIDOC is an information handling arm of DRDO with its own inhouse publishing facility comprising content handling team, editorial section, design and DTP team, and printing facility with adequate infrastructure. The Organisation brings out a variety of publications-both regular and adhoc, technical bulletins and journals and also provides its publishing acumen to other DRDO Laboratories. The DTP facility is operating for more that 20 years and the team is conversant with a range of software tools applying them to get desired document with user satisfaction. This setup has grown from a one room 2 computer facility to more than 30 computer facility. Over the years the team has been at the forefront of experimenting to find a best combination of software tools to deliver optimum results under typical governmental factors playing a role in shaping up a facility to cater ideally to user requirements. What are these factors influencing the selection of DTP software?

4. STATEMENT

Imagine a transition from a letter press facility working with galley proofs to a mechanical typesetter and then to software based DTP facility with a set of same manpower who have a minimal incentive to learn is an arduous task for any manager with a equally challenging environment of acquiring ideal hardware at lowest cost, getting output which has no precedence and getting approval of users for the desired quality met with many hiccups. Till now, the various tasks of designing were accomplished with the use of variety of software for text, graphics, equations, tables, etc. It is a journey that still continues – to find ideal software which can be easily learnt and could handle all types of documents.

5. SCENARIO IN INDIAN GOVERNMENT ORGANISATIONS

If we discuss the publishing setup in a Indian government organisation, there are a couple of factors which are common to all. The manpower is with long experience and tools of the work are long obsolete. The organisation has to work in a low cost milieu and maintenance of equipment is difficult due to cumbersome processes. Some equipment is used beyond their useful life as there is no replacement or has not been acquired due to some reasons. Then there is training issue as a person who has a set of skills is not willing change to adopt new tools to upgrade. In a scientific organisation, there are not many persons with Masters in Science or engineering and a communication or journalism background. Hence re-skilling becomes all the more important. These issues are elaborated here.

5.1 Manpower Issues

The manpower is recruited generally with existing technology setup in the market, let's say around 30 years ago when computers were not popular. The editorial person is also from science or engineering background and preferably with additional qualification in journalism or communications. Those types of recruits are normally not available in the country. The person who designs the document has been composing text or drawing illustrations manually and is useful to the organisation in early part of his or her career. After 10 years or so the technology changes in the marketplace but there is either no incentive to change or there is reluctance to change. Only a few are willing to adapt new technology or learn new software. New recruits are too few as a result of focus on outsourcing. The government is on downsizing the permanent employees; those have come down to 3.1 million in 2012[2]. Training new skills to an old employee is an ongoing process and is only a partial success. The training methods need to be for longer duration in a external environment and supported by internal infrastructural changes simultaneously to bring effective changes.

5.2 Technology Trends of Publishing Software

The technology changes in the publishing industry have been very fast, particularly in past decade. Most of the changes have been in pre-press scene and offset printing machines. After the advent of internet there is more widespread content generation for online view and there has been quantum leap in content on internet. Every print media has been forced to have a online presence to cater to new generation user who adopts electronic medium, mobile and PC to get his information needs fulfilled. The need for long prose and lengthy discussions in reams of paper has given

way to shorter and direct methods due to availability of more information from diverse sources and decreasing attention span of the reader. SMS and crisp quotes are the order of the day. Only in research arena there is increase in number of papers as evidenced by prolific increase in number of scientific journals but the journals impact factor is lot to be desired. All these journals have either outsourced their design and printing operations or have established their own in-house centres as the requirement of infrastructure is minimal. A typical operation of processing a document for publishing is shown in Fig. 1.

In the following passages we will discuss the development of these software in pre-press operations and how each one is suited for bringing out a research/scientific publication.
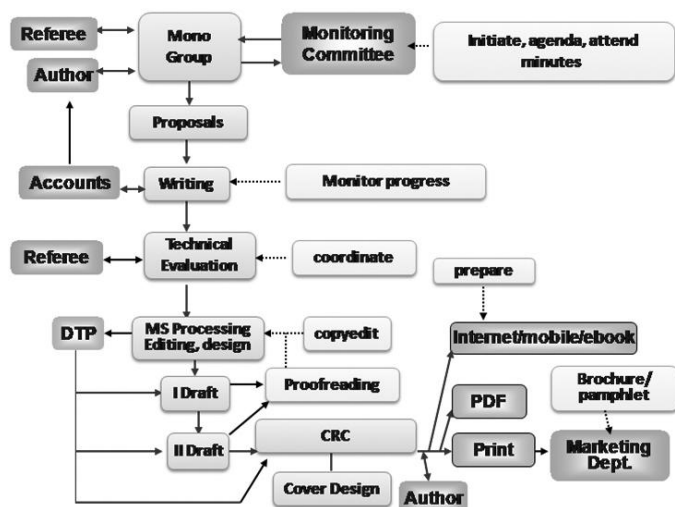
Figure 1. Typical work flow of publishing a document.

6. TYPES OF SOFTWARE

There are three kinds of software typically used in publishing industry. These are word processing software, image processing software, DTP or composing software in addition to mathematical and equation handling software. Outputting or pre-press software is also nowadays part of DTP setup which prepares a document acceptable for a commercial printer, i.e., acrobat or a camera ready copy (CRC).

6.1 Word Processing Software

This is the start of the document writing process and author utilises this software to pen his thoughts or findings. Earlier it used to be pen and paper. Now in the modern age, direct input is done to add text, images, tables, references and make a article and submit for publishing. The publishing house further improves the document by applying editorial, stylistic, organising and many other changes to confirm to the

inhouse compliance standards and style. Over the years, DESIDOC has been using a number of software starting from Wordstar to MS Word.

6.1.1 Wordstar Software

Wordstar was a DOS based program with basic features and pull down menus and print features and the last version used was 7.0. It did not feature WYSIWYG and had only one functional font to view the document and there was no mouse to navigate but changes were done using control key. The auto flow feature was not available and text had to be manually reformatted after rephrasing of text[3]. The purpose was to finalise the document and remove any fault and then DTP was done in another software. This was however better than the electronic typewriter which used a daisy wheel to print characters. This was the first software program to be installed and used after the typewriter. The bulk of work was done to send letters using mail merge to multiple addresses. This software remained in use for almost 7 years in DESIDOC.

6.1.2 Wordperfect 5.1 for DOS to 7.0

The DOS version had similar features like wordstar with pull down features with conventional functional key usage from F1 to F12, tables and full function of doing italics, bold, etc with print options[4]. It also featured print preview mode to show the view of document before printing. As the users were used to Wordstar commands, many were not willing to learn the new tool even though it was better as it involved memorising key combinations for various functions. This remained unused in the organisation with only 2-3 people handling the document prepared using wordperfect. Both programs were installed in same computer, but since more people were conversant with Wordstar, it became the de-facto program to be used.

6.1.3 MS Word for Windows Ver 6 to 2010

Microsoft Word was initially popular in windows 3.0 onwards as the software was easy to use by a novice in a windows graphical environment. All that was needed was to use the mouse and click on drop down menus and use font, paragraph and align properties as required to get the desired look. It featured the auto-format of text and autocorrect of typing mistakes. This was a major update of wysiwyg feature and with a proper graphical driver, the print out reasonably resembled the screen view. This also required the hardware change in the form of 386 machine with upgrade of processors and memory. This was mostly due to graphical interface provided by windows OS. After this all users were doing word processing tasks.

A better version in the form of word 95[5] followed that had better features and bundled with a suite of Excel, Powerpoint, access along with word for other work. The Word had a dictionary, spell checker and a thesarus to aid tasks and mail merge and database functions were supported by Excel and Access. This software continued in the office and were regularly upgraded to XP, 2005, and 2007 version and continuing till date. The new employees were also taught the same by old hands and training responsibility was off from the Scientists and they could concentrate on other software learning. One feature that was helpful was composing of equations in Equation editor that was later used in DTP software also. Since finer aspects of getting the camera ready copy was not possible in Word as DTP Software offered more control and better printing quality. The latest versions offer direct conversion to pdf or html document for commercial printing or online distribution as required, but the html version still needs the sophistication of dedicated software. In addition Word 2013 offers sharing, collaboration, visual effects, translation, inbuilt image editing, alignment with guides feature offering more complete experience[6].

6.2 DTP Software

In the DTP software, the factors affecting the selection of software were ease of use, availability in India, easy to procure, knowledge on how to use and its previous usage in the department. These factors were prominent in deciding and continuing with DTP software types. In these, also, there were composing software, vector image handling programs, and raster image handling programs. Over the years, DESIDOC used a variety of software and these are listed in following sections.

6.2.1   Ventura Publisher Version 2.0 to 7.0

The ventura publisher was one of the full-fledged page make-up software suite that worked on menu based controls to handle text, placement of images– both raster and vector and had elementary facility of drawing tools like frames, table creation, headers and footers, auto flow, and manipulating text around frames, importing illustrations after they have been made in separate program or a scan from a half tone. The version 2 was on DOS and version 4.0 started using Windows GUI. The main file used to be small as it created many other files describing styles, adding changes to word processing file and not retaining them in main file. This allowed updating the text changes whether it was done in word file or in Ventura file. The style sheets are format descriptors for giving unique look to items like letter, fax, posters, magazines or newsletters that retained size of fonts, their placement,

adding colour, other recurring items such as headings, subheadings, body text, etc[7]. This software in later versions (4.0 onwards) even allowed to compose perfect mathematical equations in the program and get a print out. This software in later edition kept on adding more features but a biggest drawback was that under windows platform the program started to hang and files used to get corrupted and all the work needed to be redone. This software was very structured in approach and did not allow placement of any text or other elements outside page area like pagemaker. This allowed to create long documents like books where internal consistency was important. Slowly, no more ventura software was purchased beyond version 7. This however was overtaken by pagemaker due to its simplicity and flexibility.

6.2.2   Adobe Pagemaker 4.0 to 7

The pagemaker as opposed to ventura offered simplified menu and even novice could get office document readied on his own due to its frame movability, stable operation and good print quality. This had built-in text processor, frames for graphics, text, and master pages where repeatable elements could be put all in a single file. This also had import filters for importing the word, photoshop, illustrator files. All the frames of text, graphic could be resized, reflowed, and placed anywhere in the layout. The software had professional typographic controls with up to 0.001 em increment kerning that could be resized with font size. Gradually over the versions the package incrased support for long document by adding TOC and Index generation automatically. It also had postscript support for high quality printing in offset press. The completed document could also exported as EPS files for high quality printing. Later versions offered exporting to pdf which was used for archiving purposes as well as printing. The only drawback was that it had only one level of undo. The negatives were that equations had to be composed in separate equation editor and placed in the document with separate linked file even for a single symbol created in equation editor as the Windows XP platform did not recognise copy-pasted items in pagemaker while printing and printed these items especially equations anywhere on page. This was not so in Windows 98 OS as any item copy pasted in pagemaker was reproduced in WYSIWYG form. The adobe pagekmaker nevertheless continued due to its ease of use and still being used in some form or other in older machines/OS.

6.2.3   CorelDraw 2 to X6 versions

This was an original and still continuing graphics package producing excellent vector diagrams much needed in S&T publications for graphs, and R&D

sketches. This package offered a welcome feature that any picture or graph copy pasted was retained and could be directly printed without creating a link file. This offered immense design of page flexibility and especially popular in commercial circles as the flexibility of manipulating objects was not surpassed by even illustrator. Its learning curve was not steep and many features could be self learnt. Added to it there a library of vector images, templates and copyright free fonts that could be used in the CDR file. It essentially remained a design tool and for a small graphic intensive bulletins or newsletters. Any line diagram that was created could be exported in a variety of formats and the eps file created was quite small but with high clarity that could be further used in any page flowing software. Another feature that is useful was creation of ISBN bar code within the software and exporting it for use on cover designs. This is still being used for cover designs and making of illustrations, and smaller page documents. This is not that flexible for long documents as frequently any conflict results in file hanging and corruption till recently. The current version has moved towards digital medium for capturing any image or creating web designs.

6.2.4 Adobe Photoshop

This is regarded as one of the best image editing software in the market and it has ruled the top charts since long time. It has lot of plugins to give many effects but for publishing industry in S&T field, this is used to manage half tones, correct photos, do touch-ups, crop and convert RGB/CMYK formats. It is also used to create backgrounds for covers. The learning curve to master it is very steep and only the required features are used irrespective of the version available. The out put is generally used in the page layout software for combining with text and other elements. Only those who are already familiar with the software tools are using the latest versions.

6.2.5 Adobe Indesign 1.15 to CS6

The page layout software like pagemaker was discontinued after 7.0 version and concurrently Indesign was launched that was more structured towards long documents and for digital medium and printing in offset press but still did not support equation creation. This software now features independent paragraph styles and character styles also and has some features similar to pagemaker but more similar to Quarkxpress. The suite also comes with acrobat that offers more customised creation of print document with last minute corrections and export option for either web or print. In digital publications it can create epub or swf files. This also features an alternate layout for simultaneously creating a single document for multiple formats like print, kindle reader, Ipad, etc., from page menu. There is a content collector tool and content place tool that can organise multiple files from clip board and place them selectively and the text frames can be auto sized to fit contents. Finally, the software is inclined towards cloud service and in India due to erratic internet connections and due to expiry of document once the subscription is over or not renewed, there is a need to look out for alternatives, as in S&T organisation putting capital on subscription based software as a service (SAAS) is not going to be tenable and important knowledge created using indesign will raise questions if it is not usable in future. Already there is a move to create using open source software and training employees in a limited way. This is one of the factors affecting usage and adapting of software for print publications that is having some 10-15 years left.

7. DISCUSSIONS

Technical Factors

- The software needs to mainly be stable and easy to use
- It should be compatible with various formats for importing as well as exporting
- It need to provide for composing equations within the document
- The various elements of document is currently being created in different programs and then imported, but this needs to be seamless.
- As the information needs are digitised, closer interaction with digital formats and reading canvas sizes needs better understanding for optimum satisfaction. The studies on readability aspect is scanty and subjectively assessed
- The professionally designed templates provided by the program is never used as there is always a need for tweaking them, and it should provide alternatives and flexibility to change them easily.
- The software needs to be backwards compatible for maximum possible versions as many old files are re-used and resaved in old formats.

Non-Technical Factors

- The avenues for training for usage needs to be many and easily reachable as the employees in Govt organistion are constanly reshuffled or transferred to other jobs.
- The learning curves need to be gradual initially and the person using DTP program can be helped with interactive menus or artificial intelligence tools if the type of document is being created is defined.
- Even though help files are put on company websites, accessing them by user is not done, rather he skips it.
- The selection should also be based on the software

company's long term aim whether it would support the format/software in the long run and whether it will use predatory pricing in future.

• The software being used in the organisation has any users already using it.

8. CONCLUSIONS

We have seen that there are so many software packages used in the organisation over a period of 20 years witnessed by high churn of companies that many of them do not exist today. A user has to constantly upgrade his software to make his data or information current and readable irrespective of software or companies that make those formats. It is pertinent to keep in view that there are technical as well as non-technical factors at play in selection, usage and upgradation of software in DTP as provided in discussion.

निष्कर्ष

हमने 20 साल से अधिक की अवधि में कंपनियों के उच्च मंथन में संगठनों द्वारा कई सॉफ्टवेयर संकुलों का उपयोग देखा है उनमें से अनेक आज मौजूद नहीं है। सॉफ्टवेयर या उनके प्रारूप बनाने वाली कंपनियों की परवाह किए बिना अपने डेटा या जानकारी को वर्तमान और पठनीय बनाए रखने के लिए एक उपयोगकर्ता को लगातार अपने सॉफ्टवेयर को अद्यतित करते रहना होता है। जैसा कि उपरोक्त चर्चा में बताया गया है, इसका ध्यान रथना प्रासंगिक है कि डीटीपी में सॉफ्टवेयर के चयन, उपयोग और उन्नयन में तकनीकी और साथ ही गैर–तकनीकी कारक काम करते हैं।

REFERENCES

1. Scholderer, Victor, Johann Gutenberg, Ed.2 rev. 1970.

2. Figures bust myth India's bureaucracy is bloated. The Hindu, New Delhi, 30 Jan 2012.

3. Edwards, J. Wordstar 7.0. Course Technology Inc. 1994. pp. 176

4. W.E. Peterson. Almost Perfect. Early history of Word-Perfect Corporation and the WordPerfect program. Prima Publishing. 1994. p. 236.

5. Solomon, Christine. Developing applications with Microsoft Office 95. Redmond, WA: Microsoft Press. 1996. pp 540. ISBN 9781556158988.

6. Bradley, Helen. 10 Killer features in word 2013. PC World. January, 2013, 71.

7. Meyer, John. Xerox Ventura Publisher Edition. Reference Guide. Xerox Corp 1987. p.520

8. http://blog.softwaremedia.com/2012/05/top-features-of-coreldraw-graphics-suite-x6/. Accessed on 03 Feb 2015

डीआरडीओ मोनोग्राफ का डिजिटल प्रकाषन
Digital Publishing of DRDO Monographs

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सारांश

यह षोधपत्र ई–पुस्तकों और लक्षित विभिन्न प्रकार के ई–पाठकों के लिए ई–पुस्तकों को होस्ट करने में इसके वेब अनुप्रयोग में डीआरडीओ मोनोग्राफ के विकास का एक गहरा विवरण प्रदान करता है। परीक्षण और विभिन्न ई–प्रारूपों के विष्लेशण के बाद ई–पुस्तकों को दो प्रारूपों, पीडीएफ और एंड्रॉयड, आईओएस और विंडोज उपकरणों के लिए उपयुक्त ई–पब में विकसित किया गया है। इसके बाद ई–पुस्तकों को वेब अनुप्रयोग में अपलोड और सुरक्षा ऑडिट के अधीन किया गया। बाद में इसे ऑनलाइन वितरण के लिए इंट्रानेट और डीआरडीओ वेबसाइट पर होस्ट किया गया। ई–पुस्तकों के लिए अभिलेखीय पीडीएफ बनाए गए हैं और इन्हें नियमित रूप से डेटा बैकअप द्वारा प्रबंधित किया जाता है।

ABSTRACT

This paper gives an in-depth experience of development of DRDO monographs into e-books and its web application to host the e-books targeting various types of e-readers. The e-books were developed in two formats-pdf and e-pub suitable for Android, iOS and Windows devices after testing and analysis of various e-formats. These e-books were then uploaded into the web application and subjected to security audit. It was later hosted on DRONA (intranet) and DRDO website for online distribution. Archival PDfs were created for ebooks and a regular databack-up is managed.

Keywords: Digital publishing, monographs, e-books, e-pub, pdf

1. INTRODUCTION

Researchers and scientists are accessing scientific and technological content more and more on screens and less in traditional print. Information in digital form is highly used for everyday work in sciences and this has enhanced access to scientific data, information and literature significantly. This is also accelerating the discovery and communication of knowledge within the scientific community. Various types of scientific content are being accessed from multiple screens, multiple times a day in scientific organisations across the world.

The Defence Scientific Information and Documentation Centre (DESIDOC), is a central resource information centre for Defence Research and Development Organisation (DRDO). It is the centre of excellence in acquisition, processing and disseminating S&T information on cutting edge technologies for defence R&D. For a scientific organisation like DRDO, where scientific research is a core area, it is highly important that information is readily available and accessible to researchers, DRDO scientists, and innovators so that the information can be used to create products and services that meet the demands of the Services. Thus,

the Monographs Division of DESIDOC publishes scientific information in the form of monographs and disseminates through conventional and digital publications. This paper describes the development of DRDO monographs into e-books and the development of a web application to host the monograph e-books on various reading devices.

2. PUBLISHING PROCESS AND ITS TRANSFORMATION

Traditional print process is the most common method followed by publishers, institutions and various S&T organisations. Traditional publishing represents a typical, familiar workflow and its familiarity makes it easy to use for existing authors and editors. The traditional publishing workflow begins with authoring in MS Word followed by editing on screen/paper after which the text is composed using desk top publishing (DTP) software. The process of proofreading is done in PDF or on paper followed by finalisation to camera-ready-copy and print. Today, with the advent of digital publishing and availability of various devices, there arises the need to achieve full, device-independent publishing. The traditional workflow needs to change.

To fulfil the demands of researchers, scientists and multiple user-groups, print-oriented content is converted to e-books. The drawback in this method is that any small change in content leads to changes in the production copy or the content is exported back out to Microsoft Word and then re-laid out for a new publication. This is definitely a long and tedious process leading to inadvertent delays. Now-a-days, the in-house publishing workflow is being used in many publishing houses to deliver both print and e-books. It is very similar to the traditional publishing workflow except for the end product, which is not only paper but also digital. Various desk top publishing (DTP) software for books such as Adobe Indesign, ePaperFlip, QuarkXPress, and CorelDRAW support in-house publishing. Many publishers have opted for in-house publishing as no change is required in the process or technology. The setback here is to publish in different ways depending on the channel and device. The digital era has brought in rapid development and promotion of electronic publishing and content consumption across the world. Online delivery mechanisms of digital publications, which include e-journals, e-books, e-texts, and new digital media and content, are enabling scientific and research community to access information at the click of a mouse. Thus, more and more information is becoming available online 24×7.

3. DRDO MONOGRAPHS

DESIDOC publishes the DRDO Monographs/Special Publication series in print form and disseminates S&T information to the scientific research community. Tacit knowledge of senior eminent scientists who have done life-long research in Defence areas is collected and compiled in the form of monographs. DESIDOC has been publishing monographs since 1994. About 34 monographs have been published till date and they are available as print copies. They are widely distributed to all DRDO labs, scientific organisations, academic institutions, national libraries, training institutes of the Services, and parliamentary library.

The DESIDOC, using in-house publishing started publishing e-books and has become one of the pioneer labs in DRDO to publish e-books. All DRDO monographs that were published from 1994 to 2014 have been published as e-monographs.

4. DIGITAL PUBLISHING OF MONOGRAPHS

The development of monograph e-books is of immense help to researchers and scientists in DRDO. With an estimated number of 10,000 to 15,000 users, DRDO monographs are readily available to researchers and scientists for their research work giving in-depth DRDO research information on specific subject areas. A project on Digital Publishing of Monographs was taken up in 2013 to convert all the printed copies available in various formats and forms of monographs into e-books. The objective of the project was dissemination of S&T information through monographs in the form of e-books in specialised research areas and cutting edge technologies for Defence R&D. All the monographs published till date was published into e-books. E-books were developed in two formats namely interactive PDF and e-pub 3.0. An interactive GUI was simultaneously developed to enable users to view the DRDO monograph e-books and download e-books on various reading devices such as Cs, smart phones, ipad and tab. Intensive testing of the e-books and the GUI was conducted for accuracy, navigation and interactivity.

4.1 Project Scope

The scope of the project was to:
- Develop e-books for all published monographs from 1994 till 2013,
- Develop a web portal for hosting and purchasing e-books, and
- Maintain digital archival of monographs.

4.2 Design/Procedural Analysis

A literature survey was done on the existing e-publishing models. Extensive study was made on the following:

(i) Development of e-books: The ways by which e-books could be developed from source files developed using various DTP software was studied. As the Division began publishing books from 1994 onwards, the formats in which the monographs developed were many.

(ii) Text, image and e-book formats: The most feasible and best output text and image formats which can well display in e-books were studied. The text formats studied were plain text, image files, RTF, ePUB (Open format by IDPF), XML, HTML, TeX, PDF (Portable Document Format by Adobe), .pdb (Palm Database File), .prc, postscript, DjVu, AZW (Amazon Proprietary format), KF (Kindle Fire Format), MOBI (Mobipocket Format) and Exe and a comparison was made for the most suitable text format. The image formats studied were GIF (Graphic Interchange Format) that is preferably used for animation; JPEG (Joint Photographic Interchange Format) mostly used in digital cameras and of perfect copy small size, TIFF (Tagged Image File Format) that is used for offset printing and not widely supported by web browser, PNG (Portable Network Graphic) that is used for online viewing using web browsers, robust, animated images is MNG, and BMP (Windows Bitmap) whose file size is large and has acceptance in

Windows programmes.

(iii) Devices: Various reading devices such as PCs, laptops, smart phones, e-readers, ipads, tablets and its compatibility for e-readers for features were studied.

The features of each, compatibility with devices, advantages, and shortcomings were studied and a comparative analysis made. The criteria were to select: (i) the most commonly used file format so that delivery of e-books will be to the maximum target group, and (ii) the e-reader that provides the shortlisted interactive features and is readily downloadable for any user on any reading device. Two formats were finally shortlisted based on the requirements criteria. They were e-pub format and PDF.

4.3 Methodology

The methodology primarily involved three phases: development, delivery and maintenance. It involved the following steps:

- Development of e-books for monographs
- Develop of interactive-user friendly GUI for accessing e-books
- Hosting of monograph web pages and e-books on DESIDOC servers
- Subjecting monograph web pages to security audit
- Data backup and archival of e-books
- Maintenance of website

4.3.1 Development of E-Books for all Published DRDO Monographs

The development of e-books from the source files developed for print involved: (i) compilation of source files, (ii) conversion into e-books, (iii) and testing of e-books.

Compilation of Source Files for Monographs: The sources files of all monographs were compiled from various sources in the Division. The monographs source files were available in three forms: hard copy books which did not have source files archived, PageMaker files in various versions with text and image files linked and Adobe InDesign files, from which e-book development could be direct.

Development of e-books: From the source files for each monograph, e-books were created in two formats: PDF and Epub files. In PDF e-books, interactivity was developed linking table of contents to text, index entries in text and back, and online cross referencing done to figures, tables, photographs, and equations. File size of PDF was kept optimum to enable fast download. The EPUB® specification is a distribution and interchange format standard for digital publications and documents. Epub files were created in XML and the e-book design components, images, photographs,

equations, chapter organization, appendixes, index entries and the interactivity was built in the XML. The output in PDF and ePub were tested for the defined technical specifications and on various reading devices and multiple browsers.

Testing of e-books: The e-books were subjected to unit testing and functional testing.

Unit Testing: Unit testing involved devising parameters for book content were created for both PDF and e-pub e-books and testing was performed in detail for every monograph.

Functional Testing: The e-books were loaded on a PC, iPad, Tab and Smart phone and the following specifications tested for every book in both PDF and e-Pub. This ensured that all specifications were available on Windows, iOS and Android devices. Functional testing of navigation and links were also tested. Besides this, in the case of e-pub files other features on e-readers like night reading, text and image zoom features, note making, navigation, marking, linking and interactivity was also tested for every book.

Accessibility Testing of Website: The website that was developed for intranet and internet was tested on three browsers: Internet Explorer, Google Chrome and Firefox. The site is currently best viewed in Google Chrome version 3.7 or 3.5 and Mozilla Firefox version 3.2.

4.3.2 Establishing Set Up for Digital Distribution of E-Books

On the completion of fully functional e-books, it was important to understand the various delivery mechanisms by which users will be able to access the e-books and the maintenance of e-books.

Development of web pages to access monograph e-book on DRDO website: A monographs website was developed for hosting the e-books on intranet and internet. An interactive user-friendly portal was developed where a user would get complete information of the monograph in the same page and would be able to simultaneously download e-book from the same page. Figure 1 shows the interactive web page of DRDO monographs. All the monographs are displayed on the main web page and a search criteria is available topic wise, year wise and on author's name. On selecting a book, the details and metadata are displayed in detail in the same window as shown in Fig. 2.

Data Storage: Archival and data backup is an important process in digital publishing. This enables retrieval of data at any point of time. Thus archival PDFs were developed from the source files and stored in the server along with the PDF and e-pub files. Incremental data backups of pdf and e-pub e-books are also taken whenever there is change for all published monographs. An alternate location for data backup and

Figure 1. Web page of the DRDO Monographs hosted on intranet.

Figure 2. Monograph details displayed on a single page.

archival is an external hard disk where data is stored in case of redundancies data would be retrieved from the hard disk.

Security Audit: The developed monographs website for intranet and internet was audited for security. The top ten vulnerabilities were tested and a safe hosting certificate given to DESIDOC. The major vulnerabilities checked were: SQL injection, PHP malicious file upload, reflected cross site scripting, cross site request forgery, insecure cryptographic storage, brute force attack, clickjacking vulnerability, weak password policy implementation, Mysql Default password, and insufficient transport layer protection.

4.3.3 Upload of E-Books on Server at DESIDOC and Hosting on DRDO Website

Upload process, Testing & Resolving Server issues: The PDF books and the e-books were uploaded on the monographs temporary testing site in DRONA and DRDO website using the Admin module. After upload of e-books, each book was tested by downloading and viewed from the front-end to check the service of the webpage. The e-books were also loaded on various reading devices and tested for functionality. The website remained on the temporary testing site for two weeks to check for any errors or issues. Instances of website not working or database errors cropped up and these were resolved by the development tTeam. When the website showed zero error after two weeks of testing phase, it was taken to the main server and the new monographs webpage hosted on DRONA.

5. RESULTS AND DISCUSSION

DRDO monographs published from 1994 till 2013 in various formats have been completely converted into e-books in two formats e-pub and PDF. E-pub format is found to be the most suitable format and is supported by iOS, Windows, and Android platforms. PDF can be distributed as it is widely used and can be used for print. The e-books are re-flowable, interactive, have easier and greater access, quick delivery and enormous navigational freedom among linked documents. Monographs e-books are a real-time asset for the scientific and research community. It is the most ideal format for disseminating research and provides high global visibility.

The monograph e-books are available on an interactive user-friendly GUI on both intranet (DRONA) and DRDO website, where a user gets complete information about the book, the author details, metadata and allows downloading the desired books on a PC, iPad, tab or a smart phone.

6. CHALLENGES

Many challenges were faced during each stage of the project. The challenges are listed below:

- The output to the e-pub format was pretty simple, but testing on different devices revealed a number of display problems, usability issues and compatibility with various browsers.
- Many weeks were spent 'hand tweaking' the output for each device, and with each new device, the job got larger and more arduous.
- Hosting the web pages and e-books on DRONA and DRDO internet server.
- Adding new books using Admin module displayed data in the database tables but were not displayed in GUI.
- Some books were not being downloaded and displayed incorrect path.
- Online shopping cart selected books but showed incorrect prices
- Web pages were not being displayed in Firefox and IE browsers on Linux systems

7. CONCLUSION

The book publishing industry's digital transformation is in its infancy with numerous opportunities for innovators, change agents and publishers. DESIDOC has ventured into digital publishing however, there is a need to rethink the way we create, manage, publish, and deliver content in an innovative way. Our processes need to be reengineered to create a more flexible and sustainable future. A production process need to be identified that would free the content to be easily transformed into whatever new formats and devices that users' desire today. DESIDOC as a publisher today is a content and service provider, capable of meeting the ever-changing requirements to all researchers and DRDO scientists. A unified content strategy is the need of the day that would help us create modular and structured content which can be repurposed for multiple information products and services.

निष्कर्ष

नवीन आविष्कारकों, परिवर्तन करकों और प्रकाषकों के लिए कई अवसरों के साथ पुस्तक प्रकाषन उद्योग का डिजिटल परिवर्तन अपनी प्रारंभिक अवस्था में है। डेसीडॉक डिजिटल प्रकाषन में लग चुका है, हालांकि, हमें सामग्री के प्रबंधन, प्रकाषन और अभिनव रूप से वितरण करने के तरीके पर पुनर्विचार की जरूरत है। अधिक लचीला और टिकाऊ भविष्य बनाने के लिए हमारी प्रक्रियाओं को फिर से तैयार करने की जरूरत है। एक ऐसी उत्पादन प्रक्रिया को चिह्नित करने की आवष्यकता है, जो सामग्री को आज के उपयोगकर्ताओं की इच्छानुसार नये स्वरूप और उपकरणों में आसानी से तब्दील करने के लिए मुक्त होगी। प्रकाषक के रूप में डेसीडॉक, आज एक सामग्री और सेवाप्रदाता है, जो सभी षोधकर्ता.ओं और डीआरडीओ के वैज्ञानिकों की निरंतर बदलती जरूरतों को पूरा करने में सक्षम है। एकीकृत सामग्री रणनीति आज की आवष्यकता है, जिससे मॉड्यूलर और संरचित सामग्री बनाने में मदद मिलेगी जिसे बहु जानकारी के उत्पादों और सेवाओं के लिए पुनः लक्षित किया जा सके।

BIBLIOGRAPHY

1. www.researchinformation.info/features/feature.php?feature-id-235. (Accessed on 02 February 2015).
2. https://digitalpublishing.acrobat.com. (Accessed on 02 February 2015).
3. www.w3.org/dpub. (Accessed on 02 February 2015).
4. idpf.org/epub/30. (Accessed on 02 February 2015).
5. buyebookreader.info/development-of-the-ebook-reader-html. (Accessed on 03 February 2015).
6. en.wikipedia.org/wiki/comparison-of-ebook-readers. (Accessed on 03 February 2015).
7. e-book-reader-review.toptenreviews.com. (Accessed on 03 February 2015).

डीआरडीओ समुदाय के लिए आईटी एवं वेब सक्षम डेसीडॉक सेवाएं
IT and Web enabled DESIDOC Services for DRDO Community

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सारांश

डेसीडॉक प्रमुख प्रलेखन केंद्रों में से एक है, जो सूचना प्रौद्योगिकी (आईटी) उपकरण का उपयोग करके डीआरडीओ प्रयोक्ता समुदाय की जानकारी की आवश्यकता को पूरा करता है। वर्तमान में, एयरोस्पेस से कृषि तक हर जगह आईटी का उपयोग हो रहा है। दिन–प्रतिदिन की गतिविधियों का संचालन करने और उपयोगकर्ता समुदाय के लिए विशेष सेवाएं प्रदान करने के एक अनिवार्य उपकरण के रूप में इसने पुस्तकालयों में भी अपने पंख फैलाए हैं। इस संदर्भ में, अपने उपयोगकर्ताओं को विश्व स्तरीय सेवाएं प्रदान करने के माध्यम से अद्यतित करने के लिए डेसीडॉक की गतिविधियों में हर जगह आईटी और वेब को विकसित किया गया है। इस शोध पत्र में डीआरडीओ के प्रयोक्ता समुदाय को डेसीडॉक द्वारा प्रदान की जाने वाली सेवाओं और विशेष रूप से पुस्तकालय और सूचना आधारित सेवाओं में विभिन्न आईटी और वेब समर्थित सेवाओं की चर्चा की गई है। यह उपयोगकर्ता समुदाय को सेवाएं प्रदान करने के लिए इस्तेमाल किए जाने वाले विभिन्न आईटी उपकरणों की भी चर्चा करता है।

ABSTRACT

DESIDOC is one of premier documentation centre which caters the information requirement of DRDO user community by using information technology (IT) tools. At present, IT is engaged everywhere from Aerospace to Agriculture. It also spreads its wings to the libraries to carry out the day-to-day activities and an essential tool for providing specialised services to the user community. In this context, IT and web have evolved everywhere in DESIDOC's activities for updating its user by the way of providing world class services. This paper discusses the various IT and web-enabled services provided by DESIDOC and in particular the library and information-based services to DRDO user community. It also discusses the various IT tools used to provide the services to the user community.

Keywords: Information technology, library services, information services, IT tools, web

1. INTRODUCTION

Technology-led developments have created new opportunities and challenges for libraries in creation, promotion, dissemination and storage of information. The library is one of the many institutions undergoing change in the face of technological advances. This, in turn, has led to the generation of new services as well as modification of existing library services and their deliverables[1].

The IT and web has become commonplace throughout the world, a natural complement to traditional library services and develops innovative ways to meet the information needs of users. Traditional online services have transformed themselves into web-based services using web technologies. The web also offers libraries the potential for more revolutionary change as well[2]. It also serves as an integrated interface to a wide variety of digital resources and web-based library services for users over a network[3].

In today's scenario, DESIDOC has applied IT and web tools for almost of all its services. The services are mainly provided to the DRDO user community through its own intranet and few services through Internet. These services are widely used by the DRDO community either on demand basis or anticipation basis.

2. DESIDOC

Defence Scientific Information and Documentation Centre (DESIDOC) is one of the premier Defence Research and Development Organisation (DRDO) located in Delhi. DESIDOC has been functioning as a central information resource for DRDO. It provides science and technology information, based on its library and other information resources, to the DRDO headquarters, and its various laboratories at various places in India availble online at DRDO website, http://drdo.gov.in.

DESIDOC mainly involves in four major activities: library, publication, printing and networking. These major activities involved are: providing desktop services to the user community through library and publication. The printing unit has the mandate to print the publication and circulate it the world-wide. The networking wing has to disseminate all the network-based services to the user community through internet as well as on intranet.

3. LIBRARY AND INFORMATION SERVICES

Defence Science Library (DSL) of DESIDOC is an ISO 9001:2008 certified central library for all DRDO user community which is providing various IT and web-based services. It also has the radio frequency identification (RFID) technology for its entire collection of book and bound volume of journals. Table 1 shows the services provided by DESIDOC with their frequency of updation.

These services aim to target the DRDO user community and majority of services provided on anticipation basis. In totality, DESIDOC has 17 library and information based services in its feather. All these services are web-based in nature and used IT tools for implementing it in DESIDOC and these services are widely used by DRDO user community. Each services has a unique in nature, and having same kind of nature are grouped together and explained briefly.

Table 1. DESIDOC services

Service	Frequency of updation
Digital Reference Desk	As and when required
Online Public Access Catalogue	Daily
New Books Arrival	Monthly
DRDO Current Periodicals	Yearly
DESIDOC Journal Search	Daily
Union Catalogue of Periodicals	Monthly
Translation Database	As and when required
Newspaper Clippings Service	Daily
DRDO Knowledge Repository	As and when required
Institutional Repository	As and when required
Strategic Information Services	Fortnightly
DRDO E-Journals Service	Yearly
Forthcoming International Conference on Military Science & Technology (FICMST)	Monthly
DRDO Blog	As and when required
DRDO Wiki	As and when required

3.1 Digital Reference Desk

Digital reference service has the unique feature which accomplishes any of the user requirements within two working days if the document is available with DSL. It uploads the e-version of the document in Intranet platform and intimates the user by email automatically. Once the demand received from the user, an Email alert will be sent to the reference librarian about the demand. After uploading the user demand, an Email will prompt the user about the status of uploading and the location of availability of the document. The user can directly download the document from digital reference desk. The automated system was developed using PHP as front-end and MySQL as back-end. Nearly 20 articles are uploaded in digital reference desk (DRD) on daily basis.

3.2 Online Public Access Catalogue

The web-based service online public access catalogue (OPAC) is provided to the user to know about the library collection through intranet from its library automation software. One can search the database by using title, author, accession number, call number, publisher, keywords, etc. It also shows the availability of the documents in the library. As on date, it has nearly 3 lakhs records in its database. The user can also find out the number of documents issued with the return or renewal date to them by registering with library database through OPAC. The user can further reserve the document if it is required by them through OPAC. The user also will be informed about the new arrivals through OPAC to the user community whenever any new document is added in the database. It is a unique feature in the library database and there is no needs to bring out the new arrivals separately as many libraries used to do.

3.3 Periodicals Search

Periodicals are major part of the research activity; it is the duty of librarian to bring the details and availability of them to the user on their desktop itself. However, though this periodicals database is bibliographical level, the user has to get the full-text content from the library. Using DRDO current periodicals, the user can search the availability of the periodicals subscribed by all DRDO labs. User can locate the title and the DRDO lab which subscribe the particular periodical during the current calendar year. This service is again a web-based service and available through DRDO intranet.

DESIDOC journal search has the features of one can search the titles which are subscribed by DSL. The title further narrates the volume number and issue number is received by DSL since its inception in the library.

DRDO union catalogue of periodicals is a bibliographic database of periodicals which are subscribed by all DRDO libraries. The user can browse the database by title-wise and lab-wise. The further links will show from which year the periodicals are subscribed by the lab and missing issue/volume if any. This database was developed using PHP as front-end and MySQL as backend.

3.4 Translation Database

About 50 percent of scientific and technical literature is published in English while the rest is published in other languages. These include German, French, Russian, Japanese, Italian, Spanish and other foreign languages. DESIDOC has been providing translations of the documents originally published in foreign languages as per user demands. In the last four decades, many such translations were made available to DRDO scientific community. DESIDOC has been maintaining these translations which are now scanned and digitised to provide access to DRDO users. This full-text translation database contains translations of research papers, reports, patents, specifications, etc. and other types of documents and covers wide range of subjects and topics like aeronautics, high energy materials, life sciences, snow and avalanche science, chemistry, electronics, electrical engineering and other important fields of science. Currently, this database contains nearly 2000 translated documents which were translated from French, Japanese and Russian into English. Greenstone (GSDL) open source software is used to develop the translation database.

3.5 Newspaper Clippings Service

To keep the top management abreast of latest developments that have relevance to defence R&D, DESIDOC provides a daily newspaper clipping service. This service includes the scanning of 17 Indian (English and Hindi) newspapers. Clippings are selected, marked and arranged on the following topics of interest: Ministry of Defence, DRDO, National security and defence policy, Science and technology, International news, other news items on defence science and technology. The selected news items are sent to the top management by Email after uploading on DRDO Intranet on daily basis. This database was developed using JSP as front-end and MySQL database as back-end.

3.6 DRDO Knowledge Repository

The Knowledge Repository (KR) aims to act as a central online repository of DRDO technical reports. This is an online tool which enables DRDO scientists and professionals to have easy and seamless access to the vital information contained in the technical reports brought out by the various labs/estt. of DRDO over the years. DSpace open source software is used to implement this service over DRDO intranet in 2011. At present, KR contains nearly 25,000 reports. The user can browse the database by title, author, keywords, unique report number, lab and DRDO HQrs. One can also search the database by using simple and advanced search facility.

3.7 DRDO Institutional Repository

DESIDOC has created an institutional repository for archiving of DRDO intellectual output. It is an online archiving tool to collect, preserve, index, and disseminates digital form of intellectual assets of research institution (or organisation) and can be accessed through network environment. It also used for long term preservation of digital documents. For this DESIDOC using DSpace Open Source Software. The archives are available on both Local Area Network of DRDO and Internet (beta version hosted) to access the data to end users. This software support Open Archive's Initiatives Protocol for Metadata Harvesting (OAI-PMH) as a data provider and has managed to create added enthusiasm for the self-archiving and IR movement because the software is designed more for community-based rather than discipline based[5]. At present, the repository has the collection of nearly 6000 articles and one can browse by title, lab, author, subject and keywords. The user also can search the IR by simple and advanced search facility.

3.8 Strategic Information Service

DESIDOC has started the service to provide latest information on the ongoing DRDO projects. The service aims to keep the DRDO Project Leaders and their teams abreast with current R&D information in their areas of interest. The subject areas covered under this service are aeronautics, armaments, combat vehicles and engineering, electronics and computer sciences, life sciences, materials, missiles, maval research and development, technologies, etc. A total of 18 labs with 69 projects are covered in this service. Again PHP and MySQL is used to develop this service by DESIDOC team. This service is updated on fortnightly basis.

3.9 DRDO E-Journals Service

DRDO E-Journals consortium, called DRDO E-Journals Service, was started in 2009 with 7 major publishers now having 10 publishers with 569 titles and one service provider JCCC. The unique feature of the consortium is the coordinating labs can access the e-content of their subscribed title only instead of all the titles available in the consortium. But only IEEE extended their entire collection to all labs. Remote access facilities for 24x7 basis from anywhere

and anytime also provided to the DRDO scientific community.

3.10 Forthcoming International Conferences on Military Science & Technology

The forthcoming international conferences on military science and technology (FICMST) service covers upcoming conferences, seminars,workshops, events, and exhibitions on the topics like aeronautics, Aarmaments, combat vehicles, computer science, electronics, life sciences, management, materials science, military science, missiles, naval science and other topics related to DRDO. The service also covers the forthcoming S&T Awards & Fellowships. The aim of this anticipatory service is to inform the DRDO scientific community about the forthcoming events, both national and international, in defence-related areas and to help the scientific community abreast and update with the latest and current advancements in their respective areas of specialisation.

3.11 DRDO Blog

DRDO Blog service started on 12 February 2008 by DESIDOC for the DRDO scientists to share their knowledge, not only in their own field, but extended to all subject areas and general topic as well on intranet platform. This blog supports Unicode, if one is familiar with Unicode system, they can directly post their queries in any one of the Indian languages. Presently, five Indian languages are covered in the Blog are Hindi, Punjabi, Tamil, Kannada, and Telugu. The DRDO blog is powered by Word Press 2.0. The software is having MySQL as back-end and PHP as front-end running on Linux environment. Using this Blog, users may use/post information/promotion of particular technology and systems related to the subject areas like aeronautics, armaments, combat vehicles, computers, debate, electronics, environment science, general, library and information science, life sciences, materials, missiles, and naval research[4].

3.12 DRDO Wiki

DRDO wiki, a great tool for e-learning and researching information, has been successfully launched by DESIDOC on 22 September 2007. As an internal solution, it will enable users from all DRDO labs to add, modify, and edit information on website through their own web browsers. Using Wikipedia, every user is reader, author, and editor at the same time. The success of this project builds on the involvement of the users, the sense of the community, and a dedication to develop a powerful knowledge repository. The collaborative efforts of contributors and experts from all labs will populate DRDO wiki and in future it will bemore beneficial for the major projects of DRDO.

DRDO wiki is powered by mediawiki version 1.01. The software is having back-end of MySql and entire software is coded in PHP. User permission is open to all DRDO employees who have intranet connection. Any employee of DRDO can edit the wiki. Before editing a page in DRDO wiki, one has login to DRDO wiki or else it gives a warning like: You are not logged in. User IP address will be recorded in this page's edit history. So anyone can be traced by wiki administrator. In that process, the quality can be maintained over a period of time[4].

4.   PUBLICATION SERVICES

Defence Scientific Information and Documentation Centre (DESIDOC) is a centralised publishing wing of DRDO. To disseminate current information on research and development activities being carried out by various DRDO labs/estts. DESIDOC brings out regular publications. A number of special publications are regularly brought out by DESIDOC. Planning, organisation, collection, compilation, editing, proof checking, and finally printing and uploading are the steps being followed. DESIDOC publishes the following regular publications.

4.1 Defence Science Journal

It is a peer reviewed, open access, bi-monthly, primary research journal in the area of defence science and technology. The abstracting and indexing sources are Science Citation Index, chemical abstract, Google Scholar, DOAI, Indian Science citation index and many more. The journal is published in printed form as well as on the web (http://publications.drdo.gov.in/ojs/index.php/dsj) in the electronic form. Full-text is available both in HTML and PDF format. DESIDOC has implemented OJS for DSJ.

4.2 DESIDOC Journal of Library and Information Technology

It is an peer reviewed open access journal in the area of information technology as applicable to library and information science. It is useful for the librarians, documentation and information professionals, students and others interested in this area. The abstracting and indexing sources are Scopus, DOAJ, Indian Science citation index, Indian Science Abstract and many more. The journal is published in printed form as well as on the web (http://publications.drdo.gov.in/ojs/index.php/djlit) in the electronic form. Full-text is available in PDF format. DESIDOC has implemented OJS for DJLIT.

4.3 DRDO Newsletter

It is a monthly house bulletin of DRDO. It covers the latest developments in DRDO, important activities,

manpower development activities, patents obtained, visits, achievements, personnel news, appointments, promotions, superannuation, awards, raising day of labs, scientific meetings/workshops/conferences organised, rajbhasha related activities, etc. The newsletter is published in printed form as well as on the web (http://drdo.gov.in/drdo/English/index.jsp?pg=newsletter.jsp) in the electronic form. The DRDO Samachar is also available in print as well as online- (http://www.drdo.gov.in/drdo/English/index.jsp?pg=samachar.jsp) Full text available in PDF format.

4.4 Technology Focus

This publication brings out the technological developments in DRDO. It is a monthly issue. The focus is intended to project DRDO achievements in terms of products and technologies in their proper perspective for prospective customers and other interested both in the country and abroad. It is aimed to build a vibrant image of DRDO in the public. Prodhyogiki Vishesh is also brought out regularly. The focus is published in printed form as well as online (http://www.drdo.gov.in/drdo/pub/techfocus/2014/TF_June_2014_WEB.pdf). Full-text is available in PDF format.

4.5 DRDO Science Spectrum

This is annual publication covering the articles written by selected scientists of DRDO labs on the occasion of National Science Day. This publication is available in print as well as on intranet. Full-text available in PDF format.

4.6 DRDO Technology Spectrum

This is annual publication covering the articles written by selected scientists of DRDO labs on the occasion of National Technology Day. This publication is available in print as well as on intranet. Full-text is available in PDF format.

5. CONCLUSIONS

DESIDOC has applied information technology and web tools for almost of all its services. The services are mainly provided to the DRDO user community through its own intranet and few services also available both on internet and intranet. These services almost developed by own DESIDOC team using free or open source software. The reason for providing these services on intranet is due to the user are limited to

only DRDO and these services are catering only to DRDO community. These services are widely used by the DRDO community either on demand basis or anticipation basis. Overall the IP and web applications/tools are extremely used to provide these services.

निष्कर्ष

डेसीडॉक ने लगभग अपनी सभी सेवाओं के लिए सूचना प्रौद्योगिकी और वेब उपकरण लागू किया है। ये सेवाएं मुख्य रूप से डीआरडीओ उपयोगकर्ता समुदाय के लिए अपने स्वयं के इंट्रानेट के माध्यम से प्रदान की जाती हैं और कुछ सेवाएं इंटरनेट और इंट्रानेट दोनों पर उपलब्ध हैं। इन सेवाओं को मुफ्त या खुले स्रोत सॉफ्टवेयर का उपयोग कर स्वयं डेसीडॉक टीम द्वारा विक.सित किया गया है। इंट्रानेट पर इन सेवाओं को प्रदान करने का कारण उपयोगकर्ताओं का डीआरडीओ तक सीमित होना है और ये सेवाएं केवल डीआरडीओ समुदाय तक पहुंच रही हैं। डीआरडी.ओ समुदाय द्वारा इन सेवाओं का या तो मांग के आधार पर या प्रत्याषा के आधार पर व्यापक रूप से उपयोग किया जाता है। कुल मिलाकर इन सेवाओं को प्रदान करने के लिए आईपी और वेब अनुप्रयोग / उपकरणों का अधिकतम इस्तेमाल किया जाता है ।

REFERENCES

1. Madhusudhan, M. Web-based library services in university libraries in India: an analysis of librarians' perspective. *The Electronic Library*, 2012, **30**(5), 569-588.
2. Diaz, K.R. The role of the library website: A step beyond deli sandwiches. *Reference & User Services Quarterly*, 1998, **38**(1), 41-43.
3. Letha, M.M. Library portal: A tool for web-enabled information services. *DESIDOC Bulletin of Information Technology*, 2006, **26**(5), 11-16.
4. Faizul, Nisha & Senthil, V. DESIDOC services on social networking application: A case study. *9th International CALIBER - 2013*, INFLIBNET Centre, Gandhinagar, Gujarat, March 21-23, 2013.
5. Modi, Yogesh. Building of DRDO Archives: The Initiatives of DESIDOC. *DRDO Science Spectrum*, March 2009, pp. 249-255.
6. http://www.drdo.gov.in/drdo/labs/DESIDOC/English/index.jsp?pg=HistoricalBG.jsp [Accessed on 26 Dec 2014].
7. FICMST 2014, http://www.drdo.gov.in/drdo/egate/FICMST_Vol_10_No_01_January_2015.pdf [Accessed on 26 Dec 2014].

आईटीएम विश्वविद्यालय, ग्वालियर के छात्रों के बीच सामाजिक वेब साईटों के माध्यम से पुस्तकालय सेवा की अनुभूति : एक विश्लेषात्मक अध्ययन

Perception of Library Services through Social Web sites among Students of ITM University, Gwalior : An Analytical Study

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सारांश

आईटीएम विश्वविद्यालय, ग्वालियर (मध्य प्रदेश) भारत के छात्रों के बीच सामाजिक वेब साइटों के माध्यम से पुस्तकालय सेवा की अनुभूतिः एक विश्लेषात्मक अध्ययन का एक अध्ययन परीक्षण किया गया है। छात्रों की राय लेने के लिए एक प्रश्नावली तैयार की गयी। अध्ययन में फेसबुक, ट्विटर, लिंक्डइन, माई स्पेस, निंग, माई लाइफ, टैग, बेबो, जीमेल, ऑकुट, फिल्कर, यूट्यूब, क्लासमेट्स, हिज, स्टॉमबलअपॉन, आईबीबो, ओपेरा, माई इयरबुक, भारतस्टूडेन्ट और मीट अप जैसी केवल 20 सामाजिक वेब साइटों को ही शामिल किया गया। और कुल 100 प्रश्नावलियों को ही वितरित किया गया तथा छात्रों से केवल 92 ही भरी हुई प्रश्नावलियों को प्राप्त किया गया। 92 प्रश्नावलियों में से केवल 90 (97.83) प्रश्नावलियों का डाटा विश्लेषण के लिए चयन किया गया था और 2(2.17) प्रश्नावलियों को उत्तरदाताओं से प्राप्त अधूरे जबाबों के कारण अस्वीकार कर दिया गया था।

ABSTRACT

The study examines the perception of library services through social web sites among ITM University students, Gwalior (M.P.) India: an analytical study. A questionnaire was prepared to take the opinion of the students. The study is limited only 20 best social media web sites Face book, Twitter, LinkedIn, My Space, Ning, My Life, Tagged, Bebo, Gmail, Orkut, Flicker, You tube, Classmates, Hi5, Stumbleupon, Ibibo, Opera, My yearbook, Bharatstudent, Meet up. And total of 100 questionnaires were distributed and only 92 filled questionnaires were obtained from the students. Out of 92 questionnaires, only 90 (97.83) questionnaire were selected for data analysis and 2 (2.17) questionnaires were rejected because of incomplete response received from the respondents.

Keywords: Social web media, social network site, Face book, Twitter, LinkedIn, My Space

1. ITM UNIVERSITY

ITM University, Gwalior is established of 2011 the act of state legislature, Madhya Pradesh. itm university is sponsored by Samata Lok Sansthan, a registered charitable Trust this is provide good education. This trust successfully running various Institutions in discipline of Engg. Technology, life science, computer applications, management, nursing and education, etc

This university various teaching departments under different faculties and staff in spacious buildings and have well equipped laboratories. It was the second University in the Gwalior to introduce the BTech, MTech. MBA MSc (Biotech, Petrochemical Microbiology, Food technology) BSc, Biotech, Nursing, and BBA, BCA all stream Programmes. A distinct feature of the academic programme is the semester system and continuous evaluation of the students through quizzes, tests, and seminars.

It has been at the forefront of learning, teaching and research and leading in many different fields in its educational endeavors. In a relatively short-time span it has created an image for its excellence as an institution of higher learning through outstanding teaching and world-class research so as to produce well-rounded graduates with lifelong abilities to provide leadership within the societies they serve.

2. ABOUT THE LIBRARY

Library membership is open to members of the university and. Reference services, circulation services, open sources services and have been specially planned

to meet the growing requirements of library members. Reprographic facility is also provided to the members. Online internet access on large number of terminals is available free to the faculty and on payment to the students/ scholars of the university.

ITM University has one of the largest library spaces in the state. it is available central library of the users. Organization has been continuously enriching and updating library in both (printed and online) with available of central library 65000 books, 8500 title and 3000 CDs and DVDs on relevant subjects such as computer science, information technology, electronics & telecommunication, electronics & instrumentation, mechanical, chemical, VLSI, humanities, education, life science, management and nursing etc. Under INDEST-AICTE consortium, organization has subscribed to 512 Springer Online international journals for UG , 241 IEEE Online International Journals for Computer Science and 1821 EBSCO Online International Journals and DELNET, New journal and Trade Publication and Magazines for Management which can be accessed in the whole campus. Organization has also subscribed to 200 national journals, reputed & leading magazines on diverse subjects Viz. IT, electronics, chemical, civil, mechanical, etc and general awareness like newspaper, magazines are being regularly subscribed. Life science printed journal 16 and nursing 05 journal. Digital library with 45 PCs have been established with collection of expert lectures, presentations, reports and access to the other lectures from the institutes of national repute. An exclusive multi media room has been specially dedicated for the use our rich central library more than 3000 web lectures on around 120 topics with the facility of continuous up gradation. These lectures are available in the digital as well as web form. Almost all of these lectures are prepared by the faculty of IITs and IISC Bangalore. The facility is first of its kind in the state. Well maintained spacious reading rooms are available for reference to various journals, books, magazines and newspapers. The organization library is computerized with the support of E-Granthalaya 3.0 software packages which is an integrated multi-user library management system that supports all in-house operations of the Library. Both the software consists of modules on acquisition, cataloguing, circulation, serial control and Online Public Access Catalogue.

The library being the member of Consortia of INDEST and DELNET offers various facilities of member's institutions though resources sharing. Library also access Research & Development project updates though various institutional repositories of IIMs and IITs. Library has introduced internet service through 8 mbps leased line to the members of the library. An exclusive online facility with Wi-Fi connectivity has been generated to facilitate students and faculty pursuing their higher studies at MTech & PhD level.

3. A HISTORY OF SOCIAL NETWORK SITES

The social network sites starting in 1997 and users create profiles, list their Friends and, beginning in 1998, surf the Friends lists. Each of these features existed in some form before of course. Profiles existed on most major dating sites and many community sites. AIM and ICQ buddy lists supported lists of Friends, although those Friends were not visible to others. the Classmates.com allow people to affiliate with their high school or college and surf the network for others who were also affiliated, but users could not create profiles or list Friends until years later. Promoted itself as a tool to help people connect with and send messages to others.

Social networking sites uses of attracted millions users, it failed to become a sustainable business and, in 2000, the service closed. Looking back, its founder believes that was simply ahead of its time while people were already flocking to the Internet, most did not have extended networks of friends who were online. Early adopters complained that there was little to do after accepting Friend requests, and most users were not interested in meeting strangers. From 1997 to 2001, people mark others as Friends to follow their journals and manage privacy settings. The next wave of Social networking began when Ryze.com was founded in 2001 to help people leverage their business networks. Ryze's founder reports that he first introduced the site to his friends—primarily members of the San Francisco business and technology community, including the entrepreneurs and investors behind many future social networking sites In particular, the people behind Ryze, Tribe.net, LinkedIn, and Friendster were tightly entwined personally and professionally. They believed that they could support each other without competing In the end, Ryze never acquired mass popularity, Tribe.net grew to attract a passionate niche user base, LinkedIn became a powerful business service, and Friendster became the most significant, if only as "one of the biggest disappointments in Internet history.

4. OBJECTIVES OF THE STUDY

The objective of the present study is Perception of Library Services through Social Web sites among ITM University students, Gwalior (M.P.) India: An analytical study

- To know the awareness and use of social media site among UG student of ITM University, Gwalior.
- To find out the purpose of using of social media site among UG student of ITM University, Gwalior.
- To know the using of the social websites for information sharing and time consumed (day/week/

month) by among UG students of ITM university, Gwalior

- To know the use of the percentage of using different social websites for friendship massage in ITM University, Gwalior.
- To know the using of the social websites for chatting, friendship message, information, social work, Information about online libraries in among UG students of ITM University, Gwalior.

5. SCOPE OF THE STUDY

The scope of the study is confined to the UG students of different disciplines. The study is limited only 20 best social media websites use of UG students of the ITM University, Gwalior M.P.

Table 1. Name of the social web media sites

S.No	Name of Social web sites	S.No	Name of Social web sites	S.No	Name of Social web sites
01	Face book	08	My Life	15	Stumbleupon
02	Twitter	09	Gmail	16	Ibibo
03	LinkedIn	10	Orkut	17	Opera,
04	My Space	11	Flicker	18	My yearbook
05	Ning,	12	You tube	19	Bharatstudent
06	Tagged	13	Classmates	20	Meet up
07	Bebo	14	Hi5		
Total sites					20

6. REVIEW OF LITERATURE

- Danah M. Boyd and Nicole B. Ellison (2005) Social network sites are increasingly attracting the attention of academic and industry researcher's intrigue by their future and reach. This special theme section of the Journal of Computer Mediated Communication brings together scholarship on these emergent phenomena. In this introductory article, we describe features of Social network sites and propose a comprehensive definition. We then present one perspective on the history of such sites, discussing key changes and developments. After briefly summarizing existing scholarship concerning Social network sites, we discuss the articles in this special section and conclude with considerations for future research.
- Cecconi Alessandro (2007) social networking sites commonly refers to all those activities that are carried out with in specific online services that provides free space and software tools which allow to create networks of people. In other words, a social networking service is a Web site that allows individuals to construct a public or semi-public profile. Social networking represents

a big resource for e-learning, because of its big impact on the World Wide Web. In fact, the social networking online services a new model of knowledge management, totally based upon the worldwide voluntary contribution of users.

- Kaliam, Gitanjali (2013) Social media: an innovative education tool" was undertaken to study the relevance and importance of social media which is an in-thing among the educational sector. In an era, where the universal is the word to define common platform for the people around the world to share and exchange their beliefs, culture, traditions, knowledge, views, etc. The study concludes that our education system needs change and social media should be widely utilized for the educational purposes.

7. HYPOTHESIS OF THE STUDY

- Most of the students were using social media sites for purpose of chatting, sharing, and friendship massage, information, social work, Information about Online Libraries.
- Most of the students using social media sites are information sharing and time consumed (day/week/month) by among UG student of ITM University, Gwalior
- Most of the UG students using majority of the responding are social media sites face book, Gmail and twitter.

8. RESEARCH METHODOLOGY

The present study was conduct through questionnaire and observation methods for data collection and used random sampling technique. A total of 100 questionnaires were distributed and were obtained only 92 filled questionnaire from the students. Out of 92 questionnaire only 90 (97.83) questionnaire were selected for data analysis and 2 (2.17) questionnaire was rejected because of incomplete respond received from the respondents. Each questionnaire contains different parameters i.e. (respondent users, chatting, friendship massages, social work, and information of online libraries, information sharing & respondent of social website). The secondary data has been collected from annual report university calendar, university library, brochures, syllabi etc of the university.

9. LIMITATIONS OF THE STUDY

The scope of the study in confined to the UG Students of different disciplines of the ITM University, Gwalior (M.P.). The study shows use of Perception of Library Services through Social Web sites among ITM University students, Gwalior (M.P.) India: An analytical study and this study uses only 20 social websites.

10. DATA ANALYSIS AND INTERPRETATION

Data collected from the questionnaires were analyzed using frequency counts and simple percentage. There are a large number of users and these range from undergraduate students (BBA. B.Com, B.Sc. & B.Tech.). A sample from all categories of users was taken to find out their opinion about as below given the categories of users and the size of sample of the study.

10.1 Craze of Social Websites

About 90 % of the students reported that they are using Facebook in their day to day life to interact with their friends. 80% of the students were found to be using gmail and 70% of them were using you tube in ITM Campus. However, twitter, flickr, bharat student were used by average number of students. We do not found any respondent for ning, tagged, classmates, stumble upon and my year book in our survey (Fig. 1).
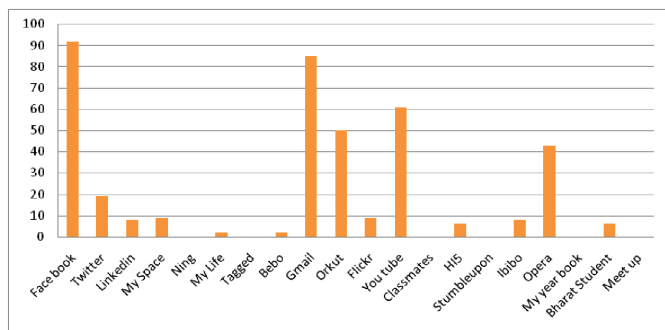
Figure 1. Percentage of respondents using different social website in ITM University, Gwalior.

10.2 Chatting

In our response to use of social websites for chatting about 90 % of the students reported that they are using Facebook to intermingle with their friends. 80% of the students were found to be avail gmail and 70% of them were using youtube in ITM Campus. However, twitter, flickr, bharat student were again used by average number of students (Fig. 2).
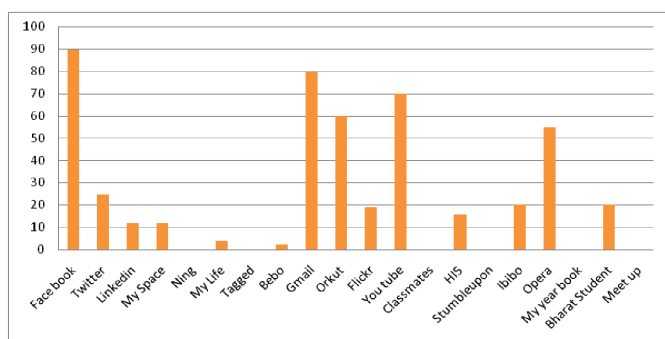
Figure 2. Percentage of respondents using different social website for chatting in ITM University, Gwalior.

10.3 Friendship Message

More than 80% of the students have been found to use Facebook for chatting with friends and 55% of the respondents reported that they are using gmail for the same. However, opera was also used by more than 65% of the students in the ITM University for chatting purposes (Fig. 3).
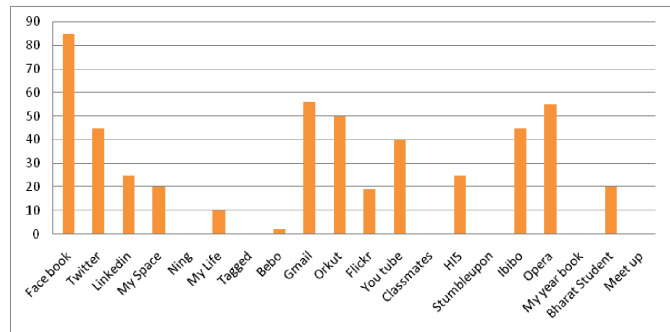
Figure 3. Percentage of respondents using different social website for friendship massage in ITM University, Gwalior.

10.4 Social Work

Again Facebook turn out to be the first preference among the students of ITM University for social work. Most of the respondents reported that gmail, orkut, ibibo, opera are the websites that are very helpful for them in disseminating their information from one person to another that help them in achieving the goal of social work (Fig. 4).
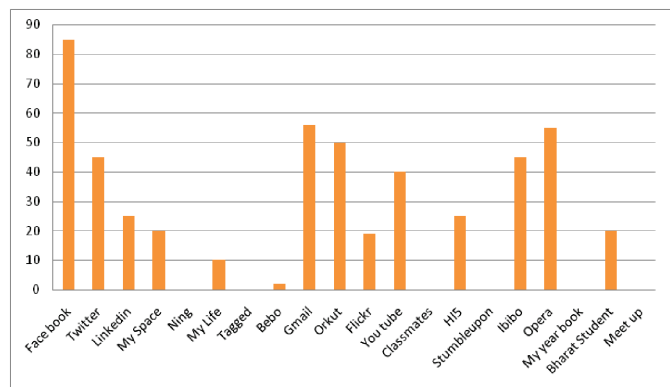
Figure 4. Percentage of respondents using different social website for social work in ITM University, Gwalior.

10.5 Online libraries

It was found by us that about 50 % of the students are using Facebook in their day to day life use information of online libraries in ITM University. 40% of the students were found using Gmail and 20% of them were using LinkedIn and my space in ITM Campus. However, twitter, flicker, Bharatstudent was used by average number of students (Fig. 5).

10.6 Information Sharing

About 80 % of the students reported that they
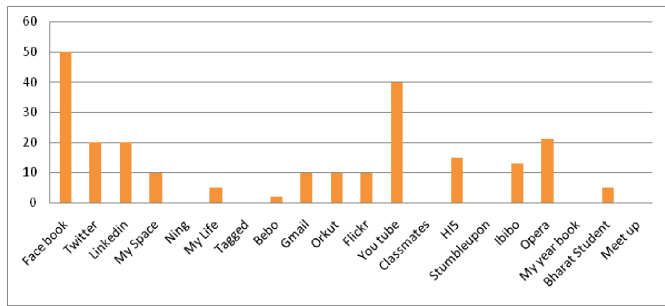
Figure 5. Percentage of respondents using different social website for information of online libraries in ITM University, Gwalior.

are using Facebook in their for information sharing in ITM Campus. 40% of the students were found using twitter, youtube and linkedin and only 10% of them were using my life in ITM Campus. However, flickr, bharat student were used by average number of students. We do not found any respondent for my year book, ning, tagged, classmates, stumble upon and my year book in our survey (Fig. 6).
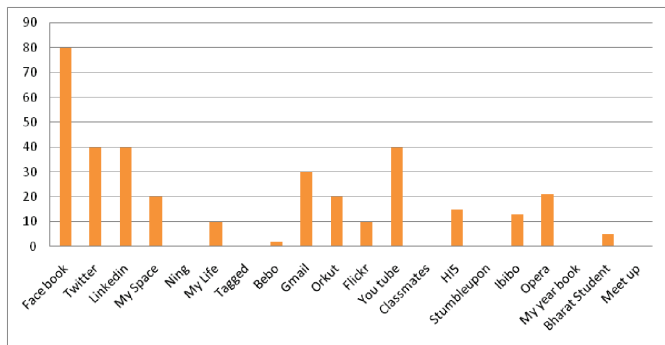
Figure 6. Percentage of respondents using different social websites for information sharing in ITM University, Gwalior.

10.7 Time consumption

As is evident from the fig 7 most of the students in ITM campus are using face book, gmail, youtube, opera in order to interact with people, download different type of subject matter and download the movies of their interest. It is therefore argued that most of the time will be consumed on these site (Fig. 7).
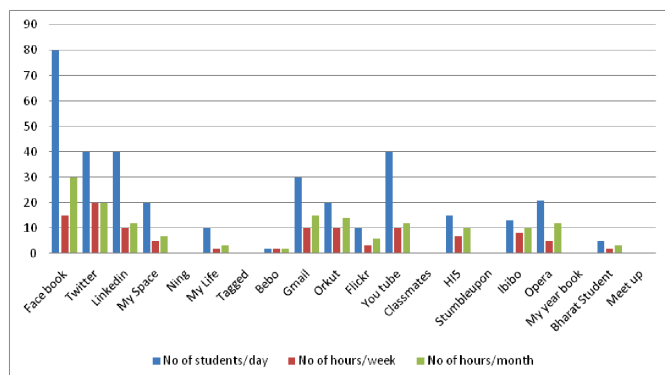
Figure 7. Time consumed by respondents on social websites.

11. CONCLUSIONS

The present study reveals that most of the objectives are met within the results. It is clear from the study that most of the respondents are aware of the social media sites and its uses for chatting, sharing, friendship message, information, social work, information about online libraries among UG students of ITM University, Gwalior. Majority of the respondents are social media sites of face book, Gmail, Twitter, etc.

1. Craze of Social Websites: About 90 % of the students reported that they are using Facebook in their day-to-day life to interact with their friends. 80% of the students were found to be using Gmail and 70% of them were using you tube in ITM Campus. However, twitter, Flickr, bharat student were used by average number of students. We did not found any respondent for ning, tagged, classmates, stumble upon and my year book in our survey (Fig. 1).

2. Chatting: In our response to use of social websites for chatting, about 90 % of the students reported that they are using Facebook to intermingle with their friends. 80% of the students were found to avail gmail and 70% of them were using YouTube in ITM Campus. However, twitter, flickr, bharat student were again used by average number of students (Fig. 2).

3. Friendship message: More than 80% of the students were found to use Facebook for chatting with friends and 55% of the respondents reported that they are using gmail for the same. However, opera was also used by more than 65% of the students in the ITM University for chatting purposes (Fig. 3).

4. Social Work: Again Facebook turned out to be the first preference among the students of ITM University for social work. Most of the respondents reported that gmail, orkut, ibibo, opera are the websites that are very helpful for them in disseminating their information from one person to another that help them in achieving the goal of social work (Fig. 4).

5. Online libraries: It was found that about 50 % of the students are using Facebook in their day-to-day life use information of online libraries in ITM University. 40% of the students were found using Gmail and 20% of them were using LinkedIn and my space in ITM Campus. However, twitter, flicker, Bharatstudent was used by average number of students (Fig. 5).

6. Information Sharing: About 80 % of the students reported that they are using Facebook in their for information sharing in ITM Campus. 40% of the students were found using twitter, youtube and linkedin and only 10% of them were using my life

in ITM Campus. However, flickr, bharat student were used by average number of students. We do not found any respondent for my year book, ning, tagged, classmates, stumble upon and my year book in our survey (Fig. 6).

7. Time consumption: As is evident from the Fig. 7 most of the students in ITM campus are using Facebook, gmail, youtube, opera in order to interact with people, download different type of subject matter and download the movies of their interst. It is therefore argued that most of the time will be consumed on these sites (Fig. 7)

निष्कर्ष

अध्ययन से पता चलता है कि ज्यादातर परिणाम उद्देश्यपूर्ण रहे। अध्ययन से स्पष्ट पता चलता है कि ज्यादातर छात्र जागरुक रहे हैं और सामाजिक मीडिया साइटों का प्रयोग बात–चीत (चैटिंग), आदान–प्रदान, मैत्री संदेश, जानकारी, सामाजिक कार्य, आईटीएम विश्वविद्यालय, ग्वालियर के स्नातकीय छात्रों के बीच पुस्तकालयों के बारे में ऑनलाइन सूचना के लिए उपयोग किया गया था और फेसबुक, जीमेल और ट्विटर जैसी सामाजिक मीडिया साइटों को उपयोग करने वाले उत्तरदाता ज्यादा थे।

1. सामाजिक वेबसाइटों का जूनूनः करीब 90 प्रतिशत छात्रों ने बताया कि वे फेसबुक का उपयोग अपने दोस्तों के साथ दै. निक बात–चीत करने के लिए कर रहे हैं। 80 प्रतिशत छात्रों को जीमेल का उपयोग करते हुए पाया गया और उनमें से 70 प्रतिशत आईटीएम परिसर में यूट्यूब का उपयोग कर रहे थे। जबकि, ट्विटर, फिल्कर और भारत स्टूडेन्ट जैसी साइटों का उपयोग करने वाले छात्रों की औसत संख्या थी। हमने अपने सर्वे में किसी भी उत्तरदाता को निंग, टैग, क्लासमेट्स, स्टॉमबल अपॉन और माई इयर बुक आदि का उपयोग करते हुए नहीं पाया। (आकृति नं0 1)

2. बात–चीत (चैटिंग)ः सामाजिक साइटों का अनुप्रयोग करने के हमारे जबाब में करीब 90 प्रतिशत छात्रों ने बताया कि वे फे. सबुक का उपयोग अपने दोस्तों के साथ आपस में मिलने के लिए कर रहे हैं। 80 प्रतिशत छात्रों को जीमेल का उपयोग करते हुए पाया गया और उनमें से 70 प्रतिशत आईटीएम परिसर में यूट्यूब का उपयोग कर रहे थे। जबकि, ट्विटर, फिल्कर और भारत स्टूडेन्ट जैसी साइटों का औसत छात्रों द्वारा दोबारा उपयोग किया गया। (आकृति 2)

3. मैत्री संदेशः 80 प्रतिशत से ज्यादा छात्रों को फेसबुक का उपयोग अपने दोस्तों के साथ बात–चीत हुये पाया गया और 55 प्रतिशत उत्तरदाताओं ने बताया कि वे जीमेल का उपयोग भी उसी के लिए कर रहे है। हालाकि आईएमटी विश्वविद्यालय में 65 प्रतिशत से ज्यादा छात्रों द्वारा बातचीत प्रयोजनों के लिए ओपेरा का भी इस्तेमाल किया गया। (आकृति 3)

4. सामाजिक कार्यः आईटीएम विश्वविद्यालय के छात्रों के बीच एक बार फिर सामाजिक कार्यों के लिए फेसबुक को ही प्र. थमिकता दी गयी। उत्तरदाताओं में से अधिकांश ने बताया कि जीमेल, ऑरकुट, आईबीबो, ओपेरा ऐसी वेबसाइट्स हैं जो एक व्यक्ति से दूसरे व्यक्ति को उनकी जानकारी के प्रसार में बहुत मददगार रही हैं और उन्हें सामाजिक कार्य के लक्ष्य को प्राप्त करने में मदद मिली है। (आकृति 4)

5. ऑनलाइन पुस्तकालयः हमारे द्वारा यह पाया गया कि करीब 50 प्रतिशत छात्र फेसबुक का प्रयोग आईटीएम विश्वविद्यालय में ऑनलाइन पुस्तकालय की जानकारी का उपयोग करने के लिए दैनिक रूप में कर रहे है। 40 प्रतिशत छात्रों को जीमेल उपयोग करते हुए पाया गया और उनमें से 20 प्रतिशत आईएमटी परिसर में लिंक्डइन और माई स्पेस का उपयोग कर रहे थे। हांलाकि ट्विटर, फिल्कर, भारत स्टूडेन्ट साइट्स को औसत छात्रों द्वारा इस्तेमाल किया गया। (आकृति 5)

6. जानकारी साझा करनाः करीब 80 प्रतिशत छात्रों ने बताया कि आईटीएम परिसर में अपनी जानकारी को साझा करने के लिए फेसबुक का उपयोग कर रहे है। 40 प्रतिशत छात्रों को ट्विटर, यूट्यूब और लिंक्डइन का उपयोग करते हुए पाया गया और उनमें से 10 प्रतिशत आईएमटी परिसर में माई लाइफ का उपयोग कर रहे थे। हांलाकि फिल्कर, भ. ारत स्टूडेन्ट साइट्स को औसत छात्रों द्वारा उपयोग किया गया। हमने अपने सर्वे में किसी भी उत्तरदाता को निंग, टैग, क्लासमेट्स, स्टॉमबल अपॉन और माई इयर बुक आदि का उपयोग करते हुए नहीं पाया। (आकृति नं0 6)

7. समय की खपतः आकृति 7 से स्पष्ट होता है कि आईटीएम परिसर में ज्यादातर छात्र लोगों से बातचीत करने, विभिन्न प्रकार की विषय वस्तुओं को डाउनलोड करने और अपनी रुचि की फिल्मों को डाउनलोड करने के क्रम में फेसबुक, जीमेल, यूट्यूब, ओपेरा का उपयोग करते हैं। इसलिए यह तर्क दिया जाता है कि सबसे ज्यादा समय की खपत इन साइटों पर हो जाएगा। (आकृति नं0 7)

REFERENCES

1. Boyd, D. Friendster and publicly articulated social networks. Proceedings of ACM Conference on Human Factors in Computing Systems New York: ACM Press. 1279-1282, 2004.

2. Barnes, S. A privacy paradox: Social networking in the United States. *First Monday*, 11 (9) Available at http://www.firstmonday.org/issues/issue11_9/barnes/index.html. 2006.

3. Boyd, D. Friends, Friendsters, and MySpace Top 8: Writing community into being on social network sites. 2006, 11 (12). Available at http://www.firstmonday.org/issues/issue11_12/boyd/

4. Danah M. Boyd and Nicole B. Ellison. Social Network Sites: Definition, History, and Scholarship, Michigan State University 1.29. 2006, (2007) Available at http//www.danah.org/papers/JCMCIntro.pdf

5. Benzie, R. Facebook banned for Ontario staffers.

The Star. 2007, Available at http://www.thestar.com/News/article/210014

6. Cecconi, Alessandro. Research paper on social networking: Research paper on social networking. management and evaluation of instructional technology and distance education programs. 2007.

7. Broughtonb, Andrea, Higgins Tom, Ben Hicks, Annette Cox. Workplaces and social networking the implications for employment relations. Institute for Employment Studies. Sovereign House Church Street Brighton BN1 1UJ UK.4-45. 2010

8. Kaliam, Gitanjali. A research paper on social media: An innovative educational tool. School of Mass Communication, Chitkara University, Rajpura. Issues and Ideas in Education.1.43–50. 2013.

Web sites Accessed
1.   https://twitter.com
2.   https://www.in.linkedin.com
3.   https://myspace.com
4.   https://www.ning.com
5.   http://www.mylife.com
6.   https://www.tagged.com
7.   https://www.bebo.com
8.   https://gmail.google.com
9.   https://www.orkut.com
10.   https://www.flickr.com
11.   https://www.youtube.com
12.   https://www.classmates.com
13.   https://www.hi5.com
14.   https://www.stumbleupon.com
15.   https://auth.ibibo.com
16.   https://www.opera.com
17.   https://www.meetme.com
18.   https://www.bharatstudent.com
19.   https://www.meetup.com
20.   www.//itmuniversity.ac.in/library
21.   https://www.Facebook.com

कर्नाटक मैनेजमेन्ट स्टडीज के छात्रों और संकाय सदस्यों द्वारा इंटरनेट का प्रयोग : एक अध्ययन
Internet use by Students and Faculty Members of Management Studies in Karnataka : A Study

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सारांश

इस लेख का उद्देष्य छात्रों और कर्नाटक विश्वविद्यालय में प्रबंधन अध्ययन के संकाय सदस्यों द्वारा इंटरनेट और इसके संसाधनों को उत्तरदाताओं के जोखिम की जांच करने के लिए इंटरनेट के उपयोग का मूल्यांकन और उसे सुलभ करना है। इसके अलावा उपयोगकर्ता को हो रही समस्याओं को उजागर करना है और इसके सुधार के लिए कुछ सुधारात्मक उपायों को सुझाव भी देना है। लेखकों ने उत्तरदाताओं द्वारा इंटरनेट के उपयोग की जांच करने के लिए संरचित प्रणाली के आधार पर एक सर्वेक्षा किया। डाटा विश्लेषण और सारणीकरण के लिए एसपीएसएस और एक्सेल का इस्तेमाल किया गया। अध्ययन से इस बात की पुष्टि कर ली गयी कि अधिकांष उत्तरदाताओं को ईमेल करने, शोध करने, रोजगार के अवसरों का ता करने और इलैक्ट्रॉनिक संसाधनों को एक्सेस आदि जैसे विभिन्न उद्देश्यों के रूप में इंटरनेट का दैनिक उपयोग करते हुए पाया गया। जानकारी खोजने में गूगल के सर्व इंजन और कीवर्ड को आम तरीकों के रूप में सबसे ज्यादा इस्तेमाल करते हुए पाया गया। इंटरनेट की गति और इंटरनेट की कनैक्टिविटी उत्तरदाओं के सामने सबसे प्रमुख समस्या थी।

ABSTRACT

This paper aims to assess and evaluate the use of Internet by students and faculty members of management studies in the universities of Karnataka. It examines the exposure of respondents to Internet and its resources. Besides, it aims to highlight the problems encountered by the users and suggests some remedial measures for its improvement. The authors conducted a survey based on structured questionnaire to investigate the use of Internet by the respondents. SPSS and excel was used for data analysis and tabulation. The study confirmed that majority of respondents found using Internet daily for various purposes such as using e-mail, research, checking job opportunity, access electronic resources, etc. Google remains the most used search engine and keyword search was found as the most common method of information searching. Access speed and internet connectivity were major problems faced by the respondents.

Keywords: Internet, management studies, students, faculty members

1. INTRODUCTION

"Recent developments in information and communication technologies, especially the internet and the web, have brought significant changes in the ways we generate, store, access and make use of information"[1]. Internet has become an integral part of library and information centres that helps in meeting the information requirements of the users in a timely manner. The relevance of Internet to the library is well described by Rudenstine "In fact, the library and the Internet are being viewed increasingly as a versatile unified system, providing an enormous variety of materials in different formats ...". The Internet and its successor technologies will have the essential features of a massive library system, where people can roam through the electronic equivalent of book stacks, with assistance from the electronic equivalent of reference librarians. In short, one major reason why characteristics of the Internet are so compatible with those of universities is that some of the Internet's most significant capabilities resemble, and dovetail with, the capabilities of university research libraries. Just as the research library is an extremely powerful instrument for learning, so too is the Internet"[2]. Internet is considered as a great information source to the academic and research community and also a great information tool to the library and information centres to supplement their information support to the user community.

Use of internet to support learning and teaching is growing exponentially, as more and more educational organisations are recognising the potential that it offers[3].

Over the years, sources of information and other opportunities available via the internet have been increasing exponentially and various programs have been developed for using internet. With the development of more sophisticated searching tools, the internet enables individual users to reach other people and institutions all over the world, and exchange or obtain information and information searching habits of internet users[4]. Internet offers innumerable avenues and prospects for the library and information centres to deliver the information products and services effectively and efficiently as compared to traditional modes. This technology has helped to build a strong image for the library as it supplements the library collection and provides one stop point to meet the complex needs of users.

2. REVIEW OF LITERATURE

A careful review of literature discloses that, good number of investigations has been carried out to study the use of Internet in India and abroad by the faculty members, students and research scholars of different academic institutions from time to time.

The Internet as an important tool for retrieving information on the World Wide Web is being used predominantly by the user community with varied purposes. The results of majority of studies showed that the it was mainly used with the purpose of accessing information and also for communication[5]; education purpose[6]; study and research[7]; making contact with overseas education and research organizations[8]; teaching and research was the main purposes among faculty members[9]; consulting technical reports[10]; communication through e-mail[11]. All these approaches to internet clearly revealed that it is the most extensively used electronic resource for finding required information[12].

Regarding the use of search engine through which users could get required information, most of the respondents in majority of studies preferred Google as the most used search engine and in some studies Yahoo as the most used search engine. While Alta Vista, InfoSeek, Hotbot and similar other search engines were used less frequently. The adherence to Google as an internet search engine is due to superior in coverage and accessibility[13] and also heavier dependence on Google as the starting point for research[14]. It was also worth noting that whilst search engines were indeed the most frequently used resource, meta search engines fared much less favourably[15]. From above analysis it can be presumed that users of internet were not well accustomed with the use of multi varieties of search engines. Thus, this area seems to be unidentified by the librarians. Therefore, they should be instilled comprehensive ideas about the web searching features of different search engines through periodic information literacy programs[16].

Internet has provided with basic search facilities to access information available to the users. As the literature showed, different authors have discussed early studies on search strategy adopted by the users. An efficient and effective search required the development and adopting of an appropriate search strategy. Search strategy is often the most important and most difficult aspect of an electronic search. It can be observed from the survey of Jansen[17] that people did feel hesitant in using advanced search techniques and indeed that failure rates was high when they are used. Zhang[18] in his study regarding the strategies for finding information sources for research, it was observed that the use of references in printed sources, search engines, personal communication and follow up references in e-sources were the most widely used strategies by the respondents (over 84 per cent each).

Later studies pointed out various search method and techniques adopted by large number of respondents. These includes Boolean operators[19]; keyword search[20]; phrase search, truncation and case sensitivity[21]; keyword and field searching[22]; Simple search23; subject term[24]; field searching strategy[25]; Keywords search is predominant among all the search strategies in surfing e-resources on the internet[26]. In addition to Boolean and other search techniques, the users also used search engines linking facility available on the library website and also by link through online journals website[27]; search engines and by typing the web address directly Parameshwar and Patil[28].

Use of internet is not free from problems as many of the studies pointed out problems such as slow access speed, took too long to view/download pages, difficult to get the relevant information[29]; Federated search tools did not provide techniques for query reformation[30] while searching information on the internet. Fatoki[31] in her study on Internet accessibility found that under funding has been the bane of the failure of most libraries in the developing countries. Lack of sufficient funds hampered the ability of libraries to keep up with rapid changing technologies and training of staff while inadequate infrastructure for connectivity was not allowed greater access to Internet information.

The Internet was indeed a different thing to different people. Some believed that the Internet was the best thing ever to have happened to advance the world of research. Rehman and Ramzy[32] in their study found that Internet provided better access to information followed by better professional contacts with distant colleagues and organizations. It had given them the capacity to carry out tasks that were previously done by librarians. And it also result in

visiting the library less frequently, and browsing print materials less frequently.

3. OBJECTIVES OF THE STUDY

The following are the main objectives of the present study:

1. To know the demographic characteristics of respondents under study in the universities of Karnataka State.
2. To study the nature of accessibility and use of internet in the universities of Karnataka State.
3. To study the purpose of using internet by the students and faculty members of management studies in Karnataka State.
4. To understand the problems of using internet by the students and faculty members of management studies.
5. To suggest measures to be undertaken by the university authorities to popularise use of internet among the user community and realise optimal benefits from the same.

4. METHODOLOGY

The researcher designed a survey questionnaire to obtain the necessary data from the respondents. The students were explained the reason of circulating the questionnaire and it was clearly affirmed that personal data will be kept confidential and the answers would be used only for the purpose of the study. The questionnaires were administered directly to students and faculty members of management studies in the universities under the study and they were given enough time to fill and collected back 687 questionnaires dully filled and used for further analysis. At the same time, the researcher also distributed a total of 120 questionnaires to faculty members and able to receive back112 questionnaires with the response rate of 87.5 per cent. After collecting the data, researcher used SPSS software to code and analyse the collected data, producing descriptive statistics that included percentages, weighted averages, frequency distributions and cross tabulations.

5. ANALYSIS OF DATA
5.1 Respondents' Demographic Characteristics

Demographics often yield important clues as to what factors contribute to respondents' use of internet. It is important to make an assessment regarding the demographic characteristics of the respondents that could have determining effects on their responses regarding awareness, knowledge and attitudes towards Internet. Table 1 gives the data gathered regarding demographic characteristics of respondents.

The distribution of the sample according to their gender consisting of 453 (65.9 per cent) male students

and 234 (34.1 per cent) female students and among the faculty members, 80 (71.4 per cent) of them were male and 32 (28.6 per cent) female faculty members. Regarding the respondents age, all the students under study belongs to age group of twenty to twenty nine. Among 112 faculty members, the large number of respondents are in the age group of twenty to twenty nine (44.64 per cent) followed 33.04 per cent of them belongs to age group of thirty to thirty nine. The distributions of respondents according to their social background consisting of 402 (58.5 per cent) students are from urban background and 285 (41.5 per cent) students with rural background. In case of faculty members, 79 (70.5 per cent) of them are from urban background and 33 (29.5 per cent) of them with rural background. From the analysis, it can be observed that nearly two-third of respondents i.e. 481 (60.2 per cent) are from urban background indicating that management education still in hands of urban mass. Looking at the educational qualification of the respondents 83 (74.1 per cent) faculty members are having only master degree and 29(25.9 per cent) having doctoral degree. Among the students 16 of them are having master's degree in some other subjects. The designation-wise distribution of respondents reveals that, highest number of faculty members is in the rank of Assistant Professor (11.14 per cent), followed by Associate Professor (1.38 per cent) and few of them are in the rank of Professor (1.50 per cent). The respondents' teaching experience as depicted in Table 1 revealed that majority (50 per cent) of faculty members had 1 to 5 years of teaching experience followed by 32.14 per cent of them had 6 to 10 years.

5.2 Respondents Library Visits

Today, the wider availability of networked information and increasing access and use of Internet has changed the attitude of what users actually read and use. They now tend to use only what is easily accessible. As a result, they visit the library a lot less. This has prompted the researcher to elicit the data on frequency of visit to the library from the respondents.

It is very much clear from table-2 that among 687 students, large number of students i.e. 669 (97.37 per cent) of them visit the library, whereas it is surprising to know that 18 (2.62 per cent) of them said that they do not visit the library. In case of faculty members, cent percent of them are visiting the library.

5.3 Frequency of Library Visits

The frequency of visit to the library is an index to judge the use of the library resources. The frequency of visiting the library differs from user category and their needs. The results of frequency of library visits by the respondents are reported in Fig.1 given below.

Table 1. Respondents' demographic characteristics

	Students		Faculty members		Total	
	Frequency	%	Frequency	%	Frequency	%
Gender-wise distribution of respondents						
Male	453	65.9	80	71.4	533	66.71
Female	234	34.1	32	28.6	266	33.29
Age-wise distribution of respondents						
20-29 Years	687	100	50	44.64		
30-39 Years	--	--	37	33.04	--	--
40-49 Years	--	--	14	12.50	--	--
50 and above	--	--	11	9.82	--	--
Social background of the respondents						
Urban	402	58.5	79	70.5	481	60.2
Rural	285	41.5	33	29.5	318	39.8
Educational qualification of respondents						
Doctorate	--	--	29	25.9		
Master Degree	16	2.33	83	74.1		
Bachelors Degree	671	97.67	--	--		
Teaching Experience of faculty members						
1-5 years	--	--	56	50.0		
6-15 years	--	--	36	32.14		
16-25 years	--	--	11	9.82		
More than 25 years	--	--	09	8.04		
Designation wise distribution of respondents						
Students	687	100	--	--		
Assistant Professors	--	--	89	79.46		
Associate Professors	--	--	11	9.82		
Professors	--	--	12	10.71		

Table 2. Respondents library visits

Response	Students		Faculty members		Total	
	Frequency	%	Frequency	%	Frequency	%
Yes	669	97.37	112	100	781	97.75
No	18	2.62	00	00	18	2.25
Total	687	99.99	112	100	799	100
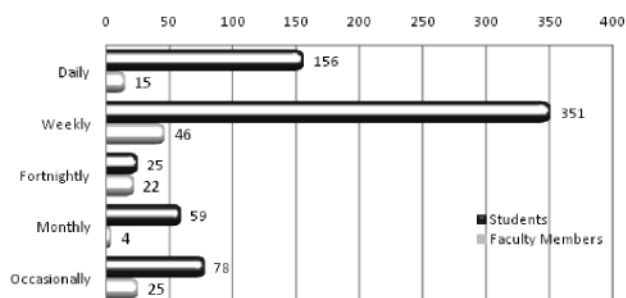
Figure 1. Frequency of library visits.
(Students N=669, Faculty Members N=112)

The Fig. 1 reveals that majority of students i.e. 351 (52.46 per cent) visit the library weekly followed by 156 (23.32 per cent) of them visit daily; 11.66 per cent occasionally; 8.82 per cent monthly and only 3.74 per cent visited the library fortnightly. On the other hand majority of faculty members visited the library weekly (41.07 per cent), followed by occasionally (22.32 per cent). Further analysis also shows that small portion of faculty members visited fortnightly (19.64 per cent), very few of them visited daily (13.39 per cent), and a meagre 3.57 per cent of them visited monthly. Thus, the data from the above table reveal that higher proportion of both students and faculty members visited the library on weekly basis.

5.4 Use of Internet

Internet is a result of the fast emerging technologies. Internet turned out to be one of the prominent sources of global information in a remarkably short period of time. The Internet provides endless access to educational and research resources that are relevant and of value to members of the University community

wherever they are located. Usefulness of the Internet to user community depends on their competency in coping with the technology and their ability to search effectively and use appropriate information. This has prompted the researcher to explore the various facets associated with the use of Internet by students and faculty members of Management Studies.

Table 3. Use of internet

Response	Students Frequency & %	Faculty Members Frequency & %
Yes	687 (100 per cent)	112 (100 per cent)
No	--	--

In response to the question regarding the use of Internet, it is found that sent percent of both students and faculty members are found to use Internet. This indicates the necessity and importance of Internet in getting access to and use of information available on the Internet in meeting the academic needs of the individuals as well as institutions.

5.5 Experience of Internet Use

Experience in the use of Internet is another important character to be identified. Experience refers to the knowledge and skill that they have gained through using Internet for a period of time. The more the scholars get exposed to the Internet and its applications, the more they start relying on its use. The table-4 indicates how much of experience do the respondents have in working with Internet.

Table 4. Experience in using internet

Experience in using Internet	Students		Faculty Members		Total	
	Freq-uency	%	Freq-uency	%	Freq-uency	%
Less than 1 yrs	143	20.81	08	7.14	151	18.90
1-4 yrs	360	52.4	16	14.29	376	47.06
5-10 yrs	149	21.68	55	49.11	204	25.53
More than 10 yrs	35	5.09	33	29.46	68	8.51

It can be observed that more than half of the students have 1-4 years of experience (52.4 per cent) in using the Internet, followed by 21.68 per cent of them have 5-10 years of experience. It is surprising to note that a significant portion of students have began using Internet just for less than one year (20.81 per cent) and very few of them have more than ten years (5.09 per cent) of experience.

Regarding the experience of faculty members, 55 (49.11 per cent) of them are being using the Internet since lost five to ten years followed by considerable portion i.e. 33 (29.46 per cent) faculty members have more than ten years of experience. It can also be observed that 16 (14.29 per cent) of them have one to four years of experience and 8 (7.14 per cent) members have been using the Internet since last one year.

5.6 Frequency of Internet Use

In order to measure the frequency of using Internet, the respondents were asked to indicate how frequently they use it. The frequency statistics reveal that more than half of the students use the Internet daily (54 per cent) followed by more than one-third of them using weekly (35.08 per cent). Further analysis also shows that very few students are using Internet with varying frequencies such as occasionally (5.24 per cent), monthly (3.63 per cent), and fortnightly (2.03 per cent).
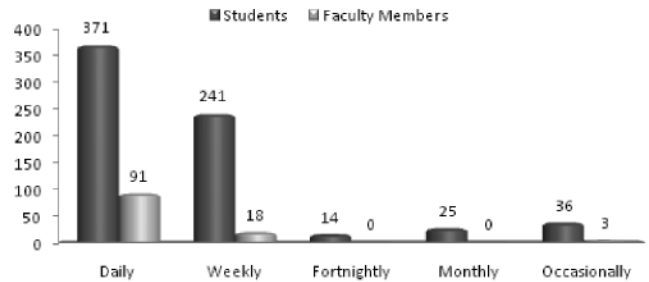
Figure 2. Frequency of internet use.

Looking at the responses of faculty members, it is found that more than two-third of the faculty members using the Internet daily (81.25 per cent) followed by 16.07 per cent of them found to have using weekly and only 2.68 per cent of them are using it occasionally. No faculty member is found to use the Internet with the frequency of fortnightly and monthly. From the analysis it can be observed that a high proportion of both students and faculty members are found to use the Internet on daily basis.

5.7 Time Spent in Using Internet

In order to assess the time spent in the usage of Internet by the respondents, the time gap has been classified into four different categories from less than four hours to more than fifteen hours and the breakdown of responses are presented in the followingTable.

It is found from the table-5 that large number of students spent less than four hours (52.69 per cent) in a week followed by 27.94 per cent of students spent five to nine hours in a week. Whereas very few students i.e. 9.75 per cent of them spent more than fifteen hours and 9.6 per cent of them have spent ten to fifteen hours in a week.

Table 5. Time spent in using Internet

Time spent in using Internet	Students		Faculty Members		Total	
	Freq-uency	%	Freq-uency	%	Freq-uency	%
Less than 4 hrs	362	52.69	59	52.68	421	52.69
5-9 hrs	192	27.94	25	22.32	217	27.16
10-15 hrs	66	9.6	12	10.71	78	9.76
More than 15 hrs	67	9.75	16	14.29	83	10.39

Whereas, in case faculty members, it can be observed from the above table that majority of them spent less than four hours a week (52.68 per cent) followed by 22.32 per cent of them spent five to nine hours a week. It can also observe that a small portion of faculty members i.e. 14.29 per cent spent more than fifteen hours in a week and only 10.71 per cent of them spent ten to fifteen hours in a week. On an average, majority of both students and faculty members under study spent less than four hours in a week in using the Internet.

5.8 Place of Accessing Internet

The users often access Internet from various places or locations depending on the convenience and availability of Internet facility. The summary of the responses on qualifying locations where users access the Internet is presented below.

Table 6 clearly indicates that majority of the students access the Internet from browsing centres (52.55 per cent) followed by department on campus (46.87 per cent). The number of students who could access from home (35.95 per cent) and library (35.66 per cent) is almost similar whereas, very small portion of students accessing from computer lab (18.63 per cent) and hostel (17.9 per cent).

On the other hand a large number of faculty members access Internet from their departments (80.36 per cent). Besides this, more than half of the faculty members also accessed Internet from their home (52.68 per cent). The browsing centres and libraries are also found to be using by nearly one third of the faculty members i.e. 32.14 per cent and 30.36 per cent respectively. A quarter of them also accessed from computer lab (29.46 per cent) and only one faculty member is found to have accessing from the hostel (0.89 per cent). The findings of the present survey have reflected a low level of Internet access in the library compared to other locations by the students. This may be due to lack of widespread access to the Internet in the universities which makes them invariably to depend on commercial cybercafés.

Table 6. Place of accessing internet

Place of accessing Internet	Students		Faculty Members		Total	
	Freq-uency	%	Freq-uency	%	Freq-uency	%
Department on campus	322	46.87	90	80.36	412	59.97
Library on campus	245	35.66	34	30.36	279	40.61
Hostel	123	17.9	1	0.89	124	18.05
Computer lab	128	18.63	33	29.46	161	23.44
Browsing centre	361	52.55	36	32.14	397	57.79
Home	247	35.95	59	52.68	306	44.54

5.9 Purpose of Using Internet

The Internet can be seen as new medium of holding exciting promises with regard to information seeking, communication, entertainment etc. There are many factors that motivate people to start using Internet with varied purposes starting from e-mail to research.

The breakdown of the findings on purposes for which the respondents use the Internet shows that, not surprisingly, e-mail has emerged as the most important purpose, being used most frequently by the large majority of students used the Internet most frequently with the purpose of e-mail (70.60 per cent) followed by checking job opportunities (31 per cent) and chatting (30.86 per cent). The entertainment (32.31 per cent) and downloading software (27.51 per cent) are also the purposes of using Internet frequently. 33.04 per cent of students are using the Internet occasionally for the purpose of accessing electronic information resources. Whereas the other purposes such as bulletin board service (67.39 per cent), discussion forums (55.02 per cent), accessing OPAC (52.26 per cent), research (49.05 per cent), frequently asked questions (48.03 per cent) are not found to be used by the majority of students.

On the other hand, email (68.75 per cent) is also found to be a major purpose of using Internet by the majority of faculty members followed by research (55.36 per cent) and accessing electronic information resources (38.39 per cent). Subsequently, the Internet is also being used occasionally with the purpose of downloading software (48.21 per cent), frequently asked questions (33.04 per cent), and entertainment (32.14 per cent). The other purposes such as chatting (59.82 per cent), checking for job opportunity (55.36

Table 7. Purpose of using Internet

Purpose of using Internet	Students						Faculty Members					
	4	3	2	1	-1	WA	4	3	2	1	-1	WA
Research	76 (11.06)	96 (13.97)	154 (22.42)	24 (3.49)	337 (49.05)	0.85	62 (55.36)	22 (19.64)	19 (16.96)	0 (0.00)	9 (8.04)	3.06
E-mail	485 (70.60)	155 (22.56)	46 (6.70)	0 (0.00)	1 (0.15)	3.63	77 (68.75)	31 (27.68)	4 (3.57)	0 (0.00)	0 (0.00)	3.65
To access EIS (e-journals, Books, Databases)	90 (13.10)	152 (22.13)	227 (33.04)	15 (2.18)	203 (29.55)	1.57	43 (38.39)	37 (33.04)	16 (14.29)	0 (0.00)	16 (14.29)	2.67
To access OPAC	35 (5.09)	60 (8.73)	188 (27.37)	45 (6.55)	359 (52.26)	0.56	12 (10.71)	26 (23.21)	28 (25.00)	0 (0.00)	46 (41.07)	1.21
Downloading software	166 (24.16)	189 (27.51)	185 (26.93)	5 (0.73)	142 (20.67)	2.13	9 (8.04)	22 (19.64)	54 (48.21)	0 (0.00)	27 (24.11)	1.63
Discussion forums	29 (4.22)	89 (12.95)	152 (22.13)	39 (5.68)	378 (55.02)	0.51	3 (2.68)	32 (28.57)	20 (17.86)	14 (12.50)	43 (38.39)	1.06
Bulletin Board Service	12 (1.75)	49 (7.13)	116 (16.89)	47 (6.84)	463 (67.39)	0.02	8 (7.14)	11 (9.82)	34 (30.36)	12 (10.71)	47 (41.96)	0.88
Frequently asked Questions	64 (9.32)	128 (18.63)	120 (17.47)	45 (6.55)	330 (48.03)	0.87	14 (12.50)	20 (17.86)	37 (33.04)	11 (9.82)	30 (26.79)	1.53
To check for job opportunities	213 (31.00)	201 (29.26)	156 (22.71)	5 (0.73)	112 (16.30)	2.42	16 (14.29)	16 (14.29)	14 (12.50)	4 (3.57)	62 (55.36)	0.73
Entertainment	186 (27.07)	222 (32.31)	180 (26.20)	9 (1.31)	90 (13.10)	2.46	22 (19.64)	18 (16.07)	36 (32.14)	2 (1.79)	34 (30.36)	1.63
Chatting	212 (30.86)	162 (23.58)	158 (23.00)	5 (0.73)	150 (21.83)	2.19	7 (6.25)	20 (17.86)	15 (13.39)	3 (2.68)	67 (59.82)	0.48

Note: Weights assigned for values are, 4- Most frequently, 3- Frequently, 2-Occassionally, 1- Cannot say, -1- Not at all

per cent), bulletin board service (41.96 per cent), access to OPAC (41.07 per cent), discussion forum (38.39 per cent), and were not at all used by majority of faculty members.

After going through the WA scale of respondents regarding the purpose of using Internet, it can be observed that e-mail is found to be used most frequently by the students and faculty members with a WA of 3.63 and 3.65 respectively. Research is found to be another important purpose (with WA of 3.06) for which majority of faculty members used Internet followed by accessing electronic information resources (with WA of 2.67). Looking at the WA scale of other listed purposes such as downloading software, access to OPAC, entertainment, FAQs, etc, it shows that faculty members are found to be used either very occasionally or may not perceived them as important where they can use the Internet for these purposes. On the other hand, besides e-mail, majority of students found to be using Internet with the purpose of entertainment, checking job opportunity, chatting, and downloading

software with the WA scale of 2.46, 2.42, 2.19, and 2.13 respectively. Thus, it can be inferred that Internet means a lot for students as they are depend more on wide variety of purposes such as a source of entertainment, employment opportunity, communication, and source for education. The students may not be interested in availing the benefits of discussion forums and bulletin board services, whereas faculty members are found to be used very occasionally.

5.10 Use of Search Engines

Internet offers variety of services and tools for the benefit of users and one such tool is search engine. The Internet has made available several search engines which helps in searching the needed information by the user. Search engines interrogate many thousands of websites and give us large number of hits. It is vitally important that the information we use for our work should be placed in an academic context. Search engines can be a good place to start if we already have some information.

Considering the WA of students with 2.86 and faculty members with 2.96, it can be inferred that Google found to be used most frequently by majority of respondents. Yahoo search engine is found to be used frequently by students (with WA 1.97) and faculty members (with WA 2.21), whereas another search engine Search.com is being used very rarely by the respondents. The rest of the listed search engines such as Altavista, MSN, Hotbot, Infoseek and SCIRUS are not found to be used by both students and faculty members. On the whole Google is found to be most popular search engine because of its inherent features that made it more popular among the user community than other search engines.

5.11 Methods of Searching Information

It is widely recognised that making information available and accessible is not sufficient in itself. There is need for users to develop skills in searching for and selecting valid, relevant and up-to-date information from the Internet and deploy such skills in teaching learning and research.

As indicated in Fig.3, there is a very good spread of use of all search options among students and faculty members who responded. The most popular method of searching the Internet by both the respondents is keyword (91.85 per cent). Keywords are important as they can be used successfully in conjunction with the search engines to get more relevant results. The second most favoured option is searching by title

by both students and faculty members is title (73.94 per cent) followed by author (32.02 per cent). The least preferred method of search is by publisher, with only 16.89 per cent of respondents indicating this option.

5.12 Problems Faced in Using Internet

The Internet with its ever growing resource base contains rich information of educational value on a wide range of knowledge. It offers innumerable avenues and prospects for the users to exploit information sources and services effectively. Though Internet has become a common information source among academic and research community, there are some obstacles that come in the way when they use it.

Respondents were asked what problems they experienced while using the Internet. With the WA scale of 3.03 and 2.77, the students and faculty members respectively were found slow access speed as a major hindrance to a moderate extent in using the Internet followed by students with WA of 2.76
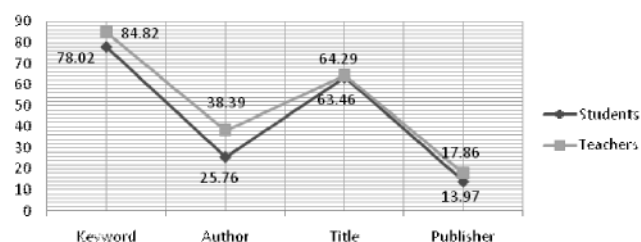
Figure 3. Methods of searching information.

Table 8. Use of search engines

Use of Search Engines	Stude				WA	Faculty Member				WA
	3	2	1	-1		3	2	1	-1	
Google	607 (88.36)	66 (9.61)	14 (2.04)	00	2.86	107 (95.54)	5 (4.46)	--	--	2.96
Yahoo	270 (39.30)	238 (34.64)	124 (18.05)	55 (8.01)	1.97	50 (44.64)	36 (32.14)	26 (23.21)	--	2.21
Altavista	21 (3.06)	49 (7.13)	112 (16.30)	505 (73.51)	-0.34	3 (2.68)	7 (6.25)	20 (17.86)	82 (73.21)	-0.35
MSN	19 (2.77)	72 (10.48)	144 (20.96)	452 (65.79)	-0.16	11 (9.82)	12 (10.71)	26 (23.21)	63 (56.25)	0.20
Hotbot	8 (1.16)	32 (4.66)	92 (13.39)	555 (80.79)	-0.55	0 (0.00)	4 (3.57)	15 (13.39)	93 (83.04)	-0.63
Infoseek	6 (0.87)	37 (5.39)	103 (14.99)	541 (78.75)	-0.5	1 (0.89)	--	17 (15.18)	94 (83.93)	-0.64
SCIRUS	8 (1.16)	32 (4.66)	67 (9.75)	580 (84.43)	-0.62	--	8 (7.14)	19 (16.96)	85 (75.89)	-0.45
Search.com	113 (16.45)	131 (19.07)	135 (19.65)	308 (44.83)	0.62	13 (11.61)	20 (17.86)	22 (19.64)	57 (50.89)	0.39

Note: a. Weights assigned for values are, 3- Most frequently, 2- Frequently, 1- Occasionally, -1- Not at all

Table 9. Problems faced in using Internet

Problems in using Internet	Students					WA	Faculty Members					WA
	4	3	2	1	-1		4	3	2	1	-1	
Getting connected	203 (29.55)	236 (34.35)	200 (29.11)	13 (1.89)	35 (5.09)	2.76	22 (19.64)	46 (41.07)	30 (26.79)	0 (0.00)	14 (12.50)	2.43
Slow access speed	285 (41.48)	228 (33.19)	137 (19.94)	9 (1.31)	28 (4.08)	3.03	35 (31.25)	51 (45.54)	11 (9.82)	5 (4.46)	10 (8.93)	2.77
Difficulty in finding relevant information	124 (18.05)	186 (27.07)	250 (36.39)	33 (4.80)	94 (13.68)	2.17	11 (9.82)	33 (29.46)	29 (25.89)	3 (2.68)	36 (32.14)	1.50
Difficult to read from the screen	44 (6.40)	113 (16.45)	196 (28.53)	40 (5.82)	294 (42.79)	0.95	6 (5.36)	24 (21.43)	42 (37.50)	1 (0.89)	39 (34.82)	1.27
Power fluctuation	87 (12.66)	121 (17.61)	179 (26.06)	57 (8.30)	243 (35.37)	1.29	18 (16.07)	14 (12.50)	33 (29.46)	15 (13.39)	32 (28.57)	1.46
pop-up ads/screens	89 (12.95)	92 (13.39)	161 (23.44)	115 (16.74)	230 (33.48)	1.22	18 (16.07)	26 (23.21)	22 (19.64)	16 (14.29)	30 (26.79)	1.61

Note: a. Weights assigned for values are, 4- To a great extent, 3- To moderate extent, 2- To a little extent, 1- Cannot say, -1- Not at all

and faculty with WA of 2.43 have find connectivity to the Internet as a major hindrance. The variation/difference in bandwidth capacity had definitely effect on the use of electronic resources. Difficulty in finding the relevant information is another hindrance faced to a little extent by the students (with WA of 2.17) and faculty members (with WA of 1.50). Since, Internet is a huge repository of information on a wide variety of subject(s) naturally it leads to some kind of problems while searching the Internet. Lack of search strategy and knowledge of search techniques seems to be the main reasons for facing difficulty by the respondents. On the other hand, pop-up ads, finding relevant information, and power fluctuation are not seems to be the major problems in using Internet and thus they do not want to comment on these problems.

6. CONCLUDING OBSERVATIONS

100 per cent of both students and faculty members of management studies were found using Internet as an important medium of communication, entertainment or information though the scope of their usage remained low.

Majority of students were found having 1-4 years of experience in using Internet, whereas faculty members were found having 5-10 years of experience and majority of both students and faculty members were found using Internet regularly.

Browsing centres and departments were found to be important locations for accessing Internet by majority of students and faculty members respectively. The reliance on browsing centres for using Internet by majority of students clearly indicated the lack of access to Internet either in the library or in the department

or the lack of time available for them to spend during the working hours would be a major cause.

Majority of both students and faculty members spent less than four hours a week, using the Internet which indicated that the both groups have not been using Internet to their true potential.

Since most of the respondents have been utilising Internet for the purpose of e-mail, there is a need for educating the users particularly students towards the benefits of using the Internet. It indicated the need for educating the users about diverse utilities of Internet, as the source of their educational/research purposes. This move within university network places would certainly help in increasing access to the resources at the discretion of the user community. This has been an important initiative as most of the management departments within the universities had extended facilities of access to laptops as a mandatory requirement for students of management. Further, continuous and timely training would ensure greater utility of Internet and its resources. The training sessions should be designed so as to give hands on experience to equip them with required skills to locate, retrieve, evaluate, and use relevant information from wide array of information available on the Internet. Functional hindrances such as slow access speed, Internet connectivity were found to be important problems faced by majority of both students and faculty members. Therefore, it is recommended to increase the bandwidth of the Internet, either on common platforms or as per requirements of individual departments in the universities. Otherwise, these problems continued to contribute significantly for poor accessibility and use of internet by all the respondents.

Among the number of search engines/tools available Google has been found to be most favoured search engine, where 88.36 per cent of students and 95.54 per cent of faculty members were found using it. It has been presumed that the students and faculty members of management studies were not well accustomed with the use of other search engines. Further, keyword search (91.85 per cent) was found to be most popular method of searching information on the Internet by the respondents.

REFERENCES

1. Chowdhary, G.G., & Chowdhary S.C. Introduction to digital libraries. Facet publishing, London, 2003.

2. Rudenstine, N. L. The Internet and higher education. Harvard Conference on the Internet and society, 29-31 May 1996.

3. Nazim, M., & Chowdhary A.H. Services using Internet and intranet technology. 49th All India library association conference 2004. Responding to user's need in changing information landscape from palm-leaf to palmtop, 29 December 2003 to 01 January 2004, Jansi:Bundhelkand University.

4. Nazim, Mohd., & Saraf, Sanjiv. A user's study of Banras Hindu University. *Annals of Library and Information Studies*, 2006, 53, 213-218.

5. Chandran, D. Use of Internet resources and services in S. V. University, Tirupathi environment. In Proceedings of Conference on Information Services in a Networked Environment in India, INFLIBNET, Ahmedabad, 2000, 124-7.

6. Waldman, Micaela. Freshmen's use of library electronic resources and self-efficacy. *Information Research*, 2003, 8(2). Retrieved from http://informationr. net/ir/8-2/paper150.html.

7. Gibson S. & Oberg, D. Visions and realities of Internet use in schools: Canadian perspectives. *British Journal of Educational Technology*, 2004, 35(5), 569-585.

8. Nasir Uddin, M. Internet use by university academics: a bipartite study of information and communication needs. *Online Information Review*, 2003, 27(4), 225-37.

9. Biradar. B.S, Rajshekar, G.R, & Kumar, B.T Sampath. A study of Internet usage by students and faculties in Kuvempu University. *Library Herald*, 2006, 44(4), 283-294.

10. Kaur, Amritpal. & Manhas, Rajeev. Use of Internet services and resources in the engineering colleges of Punjab and Haryana (India): A study. *The International Information and Library Review*. 2008, 40(1), 10-20. Retrieved form www.sciencedirect. com/science/journal/10572317/40/1.

11. Ani, Okon E, Edem, Margaret B, & Ottong, Eno J. Analysis of Internet access and use by academic staff in the University of Calabar, Calabar, Nigeria. *Library Management*, 2010, 31, 535-545. doi:10.1108/01435121011071229.

12. Hewitson, A. Use and awareness of electronic information services by academic staff at Leeds Metropolitan University: a qualitative study. *Journal of Librarianship and Information Science*, 2002, 34(1), 43-52.

13. Brophy, J. & Bawden, D. Is Google enough? Comparison of an Internet search engine with academic library resources. *Aslib Proceedings*, 2005, 57(6), 498-512. doi: 10.1108/00012530510 z634235.

14. Dubicki, Eleonora. Research behaviour patterns of business students. *Reference Services Review*, 2010, 38(3), 360-384. doi:10.1108/00907321011070874.

15. Gardiner, Donna, McMenemy, David. & Chowdhury, Gobinda. A snapshot of information use patterns of academics in British universities journal. *Online Information Review*, 2006, 30(4), 341-359. doi:10.1108/14684520610686274.

16. Swain, Dillip K. Students' keenness on use of e-resources. *The Electronic Library*, 2010, 28(4), 580-591. doi:10.1108/02640471011065391.

17. Jansen, B.J. The effect of query complexity on web searching results. *Information Research*, 2000, 6(1). www.shef.ac.uk/is/publicationinfres paper87. html

18. Zhang, Y. Scholarly use of Internet-based electronic resources. *Journal of American Society for Information Science and Technology*, 2001, 52(8), 628-654.

19. Ali, N.P.M. & Satyanarayana, N.R. Online searching of scientific information: a study of science and technology libraries in Delhi. In Proceedings of the National Conference on Information Management in E-Libraries, Allied Publishers, New Delhi, 2002.

20. Ali, N. The use of electronic resources at IIT Delhi library: A study of search behaviours. *The Electronic Library*, 2005, 23(6), 691-700.

21. Laloo, Bikika., & Lahkar, Narendra. Awareness about and use of Internet search engines amongst social science researchers in North East India. 4th Convention PLANNER-2006, INFLIBNET, Ahmedabad, India: Mizoram University.

22. Madhusudhan, M. Internet use by research scholars in University of Delhi, India. *Library Hi Tech News*, 2007, 24(8), 36-42. doi:10.1108/ 07419050710836036.

23. Kattimani, Parashuram S. Quality awareness of online information resources: A study. *International Journal of Library and Information Science*, 2010, 1(2), 31-34. Retrieved from http://www. academicjournals.org/ijlis.

24. Haridasan, Sudharma. & Khan, Majid. Impact and

use of e-resources by social scientists in National Social Science Documentation Centre (NASSDOC), India. *The Electronic Library*, 2009, 27(1), 117-133. doi:10.1108/02640470910934632.

25. Khan, Abdul Mannan, Zaide S. Mustafa. & Bharati, Md. Safay Zaffar. Use of online databases by faculty members and research scholars of Jawaharlal Nehru University (JNU) and Jamia Millia Islamia (JMI), New Delhi (India): A survey. *The International Information and Library Review*, 2009, 41(2), 71-78.

26. Sethi, Bipin Bihari. & Panda, K. C. Use of e-resources by life scientists: A case study of Sambalpur University, India. Library Philosophy and Practice, 2012, Retrieved from http://digitalcommons.unl.edu/libphilprac/681.

27. Singh, P.K.; Nazim, M.; & Singh, S.N. Awareness and use of online journals by the faculty members, researchers and students in the faculty of natural sciences, Jamia Millia Islamia University: a survey. Proceedings of the 6th International Caliber 2008, From Automaton to Transformation, University of Allahabad, Allahabad.

28. Parameshwar, S. & Patil, D.B. Use of the Internet by faculty and research scholars at Gulbarga University library. Library Philosophy and Practice. 2009, Retrieved from http://unilib.unl.edu/LPP/parameshwar-patil.pdf.

29. Madhusudhan, Margam. Use of electronic resources by research scholars of Kurukshetra University. *The Electronic Library*, 2010, 28(4), 492-506. doi:10.1108/ 02640471011033684.

30. Mohamed, Khaled A. & Hassan, Ahmed. Web usage mining analysis of federated search tools for Egyptian scholars. *Program: Electronic Library and Information Systems*. 2008, 42(4), 418-435. doi:10.1108/00330330810912098.

31. Fatoki, O.C. Library automation in Nigeria: the Kenneth Dike Library experience. *Lagos Journal of Library and Information Science*, 2004, 2(2), 111-18.

32. Rehman, S. & Ramzy, V. Internet use by health professionals at the Health sciences centre of Kuwait University. *Online Information Review*, 2004, 28(1), 53-60

इलैक्ट्रॉनिक सूचना संसाधन और कृषि पुस्तकालयों में इसका प्रबंधन
Electronic Information Resources and its Management in Agricultural Libraries

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सारांश

आईसीटी के आगमन ने पुस्तकालयों के रूप में आमूल चूल परिवर्तन ला दिया है। अकेले मौजूद पुस्तकालयों से नेटवर्क में जुड़े पुस्तकालयों के रूप में आए महत्वपूर्ण परिवर्तन ने इंटरनेट आधारित सेवाओं की निर्बाध पहुंच प्रदान की है। वेब न केवल डेस्कटॉप में मेटाडेटा स्रोतों को लेकर आया है बल्कि पूर्ण टेक्स्ट डेटाबेस को भी लाया है। संघबद्ध सर्च इंजन और नए खोज टूल्स के साथ, स्वीकृत डेटाबेसों को कस्टमाइज करना ओर खोजना आसान हो गया है। नई प्रगतियों को समायोजित करने के लिए पुस्तकालय संरचनाओं को पुनःडिजाइन करने के लिए बाध्य होना पड़ रहा है। पुस्तकालय सामग्री संग्रह इंटरनेट आधारित संसाधन और डेटाबेसों की ओर बढ़ रहा है। पुस्तकालय एक भंडार गृह से बदलकर एक ग्राहक केन्द्रित दृष्टिकोण अपना रहा है। नई तकनीकें संग्रह भंडारण और प्राप्ति की पुरानी पद्धति का स्थान ले रही हैं। अतः, पुस्तकालय का अर्थ अब किसी विशिष्ट भौगोलिक स्थान पर स्थित कोई भौतिक भवन नहीं रहा है, बल्कि इसतक किसी भी समय, कहीं भी पहुंचा जा सकता है। पूरा विश्व एक वैश्विक गांव में बदल गया है। उपलब्ध संसाधनों की संख्या तीव्र गति से बढ़ती जा रही है। प्रकाशक अपने पत्र–पत्रिकाओं को इलेक्ट्रॉनिक रूप से उपलब्ध कराने के लिए अधिकाधिक कदम उठा रहे हैं। इसके अलावा, इलेक्ट्रॉनिक संसाधनों को मुद्रित संसाधनों की तुलना में अधिक आसानी से खोजा जा सकता है। सूचनाओं को सीधे ग्राहक को उनके डेस्कटॉप पर प्रदान किया जा सकता है जिसमें न के बराबर समय लगता है। अतः, ई–सामग्री के सृजन, सुपुर्दगी और प्रबंधन पर अब अधिक जोर है। इस लेख में ई–जर्नल्स, ई–थीसिस, ई–स्टैन्डर्डस, ई–बुक्स, सीडी–रॉम डेटाबेस इत्यादि जैसे विभिन्न प्रकार के इलेक्ट्रॉनिक संसाधनों पर और कृषि पुस्तकालयों के प्रयोक्ताओं की विविध जरूरतों को पूरा करने में उनके प्रबंधन पर चर्चा की गई है।

ABSTRACT

The advent of ICT has triggered a sea change in the outlook of libraries. The paradigm shift from stand-alone libraries to the networked libraries provides seamless access to the internet based services. The web has brought to the desktop not only the metadata sources but also the full text databases. With federated search engine and new discovery tools it has become easy to customize and search subscribed databases. The library structures are forced to redesign to accommodate the new advancements. The library material collection is shifting towards internet based resources and databases. Library is changing from store-house to a client centric approach. New techniques are replacing the old method of collection storage and retrieval. So library no longer refers to physical building located in a specific geographical location but also can be accessed anytime, anywhere. The whole world has transformed into global village. The number of resources available continues to increase at a rapid rate. Publishers are increasingly taking steps to make their journals available electronically. Moreover electronic resources can be searched much more easily than their print counterpart's. Information can be delivered to patrons at their desktops directly within no time. So the emphasis is more on e-content creation, delivery and management. This article discuss about various kinds of electronic resources like e-journals, e-theses, e-standards, e-books, CD-ROM databases, etc. and their management in fulfilling diverse needs of the users of agricultural libraries.

Keywords: E-resources, electronic information resources, electronic resource management

1. INTRODUCTION

The library is an indispensible centre of civilized society. The primary function of any library is to collect, organize, preserve and disseminate the information to its users. The advent of ICTs has changed the outlook of the libraries Print reference sources like encyclopedias, yearbooks, dictionaries and bibliographies are now being replaced by DVDs or available online. The emergence of e-journals and e-books has made access to the information much faster. Digital technology

has revolutionized not only the way information is packaged, processed, stored and disseminates but also greatly altered the information seeking behavior of the user. The internet and web technology as a new media of information delivery facilitates real-time interaction. Today anyone wants to learn anytime, anywhere. E-content is now the most preferred solution for learning effectively and efficiently. Agricultural libraries now face a situation in which the sharing of resources and access to information in digital format has become the primary requirements for the users. Dissemination of information in agriculture sector is of utmost importance because of its direct impact on the farming community. Today's libraries are being redefined from a place to access books to one which houses the most advanced media including CDROM, internet and remote access to wide range of electronic resources. In the euphoria of internet revolution, we are moving from "Bricks to Clicks". Providing access to information is considered more important than owing it. Moreover user desires to have all the information in electronic form from a single point of access. So libraries should display and integrate variety of information, provide aggregate access to content and bibliographic tools that permits easy searching and reference completion. Content management has become absolute necessity. Hence, libraries have to gear up and establish content management systems using open source or commercial software. Electronic resources are available in various forms such as e-journals, databases, e-books, preprints, archives etc. Some of these are priced but many of them are available free of cost on the internet. Libraries can identify these resources for their users and provide access to them through their webpage or portal. This will enable users to access these resources remotely. Libraries attached to institutions can develop digital libraries to have control and provide access to documents which are of interest to users. These may include annual reports, manuals, research reports, project reports etc. Libraries can develop such digital library systems using any open source software or commercial software.

2. DIGITAL LIBRARY AND E-RESOURCES

A digital library posses same function and goals of traditional print-based library. The difference lies in "Digital Part" i.e. its speed, access and easy retrieval. The proliferation of e-publishing across the world has revolutionized the domain of publishing especially scholarly publishing. An electronic resource is defined as a resource which requires computer access or any electronic product that delivers a collection of text, image collection, numeric or graphic data. Most e-resources come equip with powerful search and retrieval tools that allows users to perform literature search more

effectively. Some of the popular electronic resources that are gaining ground are the electronic journals, standards, e-books, patents, trade reports, manuals, and institutional repositories of the institution etc.

3. IMPETUS TO E-LEARNING IN AGRICULTURAL EDUCATION

Dissemination of information in agricultural sector is of utmost importance because of its direct impact on the farming community. The Indian Council of Agriculture Research (ICAR) under the Department of Agricultural research and education, Ministry of Agriculture, GOI, is responsible for coordinating, guiding and managing research, education and extension activities in agriculture. Agricultural Research Information System (ARIS) was developed to strengthen the information dissemination pattern among the agricultural users. The ICAR under National Agricultural Technology Project (NATP) initiated in a planned way the application of latest ICT applications for agricultural libraries. Under National Agricultural Innovation Project (NAIP) there was an emphasis on digital content creation and management which resulted in the formation of consortium for centralized subscription of e-resources so that information can be shared. Webbased information system and database services like CeRA, Krishiprabha, E-Granth etc. have been supported through NAIP.

4. ELECTRONIC RESOURCE MANAGEMENT AND PAU LIBRARY

All University libraries, institution of national and international importance, and professional societies are building e-resource in their respective areas with aim to provide instant and comprehensive access to the users. Electronic Resource Management (ERM) encompasses careful selection, access management and delivery of the electronic content and evaluation to ensure betterment in services. The selection of e-resources largely depends upon the current and potential information needs of the users, infrastructure facilities and the policy of the respective institute. At present millions of e-resources are available in the field of agriculture. Some are free and while other are subscription based model directly from the publishers or through consortium. Panjab Agriculture University (PAU) library has rich collection of e-resources and providing access to electronic literature through CDROM databases, full text e-journals (direct subscription and through CeRA consortium), e-books from publishers like CABI, T&F, e-Theses, e-standards, online statistical/ Numeric databases, manuals and other open access resources which are freely available on the web. After selection and acquisition of digital resource it is necessary to make these resources available to the users. Information literacy programs must be organized

for effective utilization of resources. It involves creation of transparent library web page where navigation to help tools is easy and direct, organizing workshops and demonstrations by the publishers/service provider for strong publicity and improved information literacy of the users. Feed back form the user is very important for evaluating the usage of e-resources. Usage statistics (daily downloads) play important role in monitoring their worth and thus very helpful in decision making of the library system. Punjab Agricultural University library is well equipped with latest state of the art facilities.

4.1 Infrastructure facilities

PAU library has impressive infrastructure with well developed digital library division housing powerful servers with strong backup facilities and providing access under client server environment. It has

4.1.1 HCL Blade Server

It is powerful server with strong backup facilities housed in server room of digital library. It has three powerful blades with high storage and data backup facilities. Library has automated most of its services using LIBSYS software installed on the one of the blade of the blade server. Second blade is used for data backup of library database. Third blade of the server will be used for library digitization work and digital services. It provides internet and Intranet based services. IP based campus wide access to various e-resources of library has been provided through central server of the university with lease line internet facility having bandwidth of 40MBps.

4.1.2 Tulsient CDROM server

Library was subscribing to CAB & FSTA CDROM since 1990. Access to millions of bibliographic records of CAB and FSTA was available in the library as well as in the departments through this server. Nowadays access to online databases CAB and FSTA database is provided through EBESCO host.

4.1.3 Computer workstations

It has well around 12 desktops with dual core processor for providing various electronic services. Two hp scan jet 7400c flat bed scanners are available for digitization and related work. Apart from digital library, 14 thin clients are provided in the reading hall to have access to various e-resources and services. Reading halls of the library are Wi-Fi enabled so that readers can use internet facilities and other services of the library through their laptops.

4.1.4 Multimedia Facilities

Multimedia facilities like speakers, headphones and other audio visual aids are availble for use which are

helpful in preparing for exams like TOFEL, GRE, etc. Subject specific CD-ROM are available for use.

4.2 E-resources

PAU has automated its library operations like cataloguing services, circulation services etc. using LIBSYS software (Fig.1). Library has developed its database comprising of more than three lacs documents. It includes printed books, theses, bound journals and CDs. User can get the information regarding library holdings through online access to its catalogue (OPAC). access to most of the e-resources is IP based, available at library page, accessible at www.pau.edu under the head library. It provides access to information in a wide variety of formats. At present PAU library providing access to online databases which is consortia based or subscription based access model. It includes access to e-journals, e-theses, e-standards, e-books, etc. Abstracts and full text access to journal articles is available with in no time.
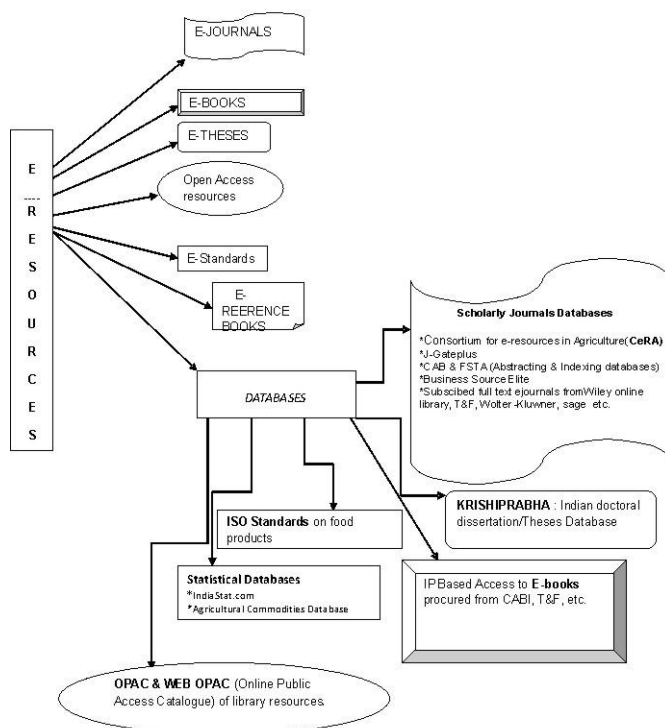
Figure 1. Bird's eye-view of e-resoure at punjab agricultural university, Ludhiana.

4.2.1 Online Databases

Library is presently providing bibliographic as well as full text access to the library records through various databases

4.2.1.1 OPAC and Web OPAC

Library has developed database of its holdings using LIBSYS software. Access to bibliographic details of more than three lacs documents is available on

intranet as well as internet just by the click of button. It provides bibliographic information of books, theses and journals. Information related to new arrival and even status of particular book whether issued or not can be checked.

4.2.1.2 e-journals databases

Electronic access to abstract as well as full text journal article is provided through the following:

4.2.1.2.1 CeRA (Consortium for E-resources in Agriculture):

It provides consortia based IP authenticated access to number of bibliographic as well as full text records of peer reviewed e-journal to the participating libraries. User can read the journal any time, anywhere. It has effective document delivery mechanism which fulfils the growing needs and demands of the user. User alert facility further fascinates the user.

4.2.1.2.2. E-journal subscription based model:

Apart from CeRA consortium, library is subscribing to a number of electronic journals which is part of our core collection catering to the needs and demands of number of departments. It requires an agreement between publisher and the subscribing institution. IP based campus wide access is provided to all the journals articles which are searchable and downloadable. Direct link to the original source i.e., publisher link is provided. These are often dependent on attributes like internet address for server, IP address range, etc. of the institute.

4.2.1.2.3. J-gate:

J-gate is an electronic gateway to global e-journal literature. It provides access to million of journal articles available online from 9000+ publishers link.

4.2.1.2.4. Bussiness source Elite:

Business Source Elite database is providing access to bibliographic as well as full text records to the research article of academic journals, technical reports, trade publications, industry profile, etc. It is very important and informative online information source for persons dealing with Management, Business and industry related information.

4.2.1.3. Krishiprabha:

Krishi Prabha is a full text database of Indian Agricultural Doctoral Dissertations submitted by research scholars to the 45 State/Deemed Agricultural Universities on or after 01st January 2000. This database has been created under National Agricultural Innovation Project (NAIP) of Indian Council of Agricultural Research

(ICAR). This service is available on PAU e-Network. This is available by clicking Krishi Prabha at online services under M. S. R. Library link on the PAU web page. This service is user friendly and can be accessed by entering the required search term in 'Search Option'. The database is being updated by the host University. This is very important source of information for the researcher. Basic as well as advanced search using Boolean operator is helpful in narrowing down the search results. It provides access seamless access to full-text records of research.

4.2.1.4. CAB and FSTA:

It provides online access to the abstracts of millions records of research in the field of Agriculture, food science and technology and allied areas. This is one of the most widely referred, reliable and important source of information in the field of agricultural research.

4.2.1.5. Indiastat.com:

IndianStat.com is statistical database which is cluster of 57 sites including india-specific,sector specific, region specific and state specific sites. It provides authentic socioeconomic data about India and its state, region and sector on more than 35 variables.

4.2.1.6. e-standards:

Standard is a document that provides requirements, specifications, guidelines or characteristics that can be used consistently to ensure that materials, products, processes and services are fit for their purpose. ISO International Standards ensure that products and services are safe, reliable and of good quality. For business, these are strategic tools that reduce costs by minimizing waste and errors and increasing productivity. The standards help companies to access new markets, level the playing field for developing countries and facilitate free and fair global trade.

4.2.1.7. Commodities database:

Commodities database provides real-time spot and futures prices, market intelligence, historical fundamental data and robust forecasts for agricultural crops. This database is ideal for investors, researchers, banking and non-banking financial institutions involved in the commodities markets of India. Commodities deliver data on 200 varieties of crops of 70 commodities from 150 markets. It also contains statistics on area, production and yield upto district level. Reports and data on the progress of agriculture, along with quantitative forecasts on production of major crops complete the product's intelligence. 'Commodities' is updated on everyday basis by an expert team of analysts. CMIE analysts use the product to forecast company, industry and regional trends.

4.2.1.8. E-books

Library e-books service is available on web link of Mohinder Singh Randhawa Library. It is an aggregated e-book and e-content delivery platform. Links to 69 full text books, through four different vendors, have been given for on-line access. Under this, access to 22 books published by CABI is given by MyiLibrary, 12 books published by Taylor and Francis are serviced by CRCnetBASE, 17 books on agriculture and related subjects is rendered by EBSCO host Netlibrary, and Business Management e-Books provides access to 18 books published by Kogan Page.

4.2.1.9. Open source documents

Links to various the documents available in open source is provided to facilitate the user. Links to various reference sources, FAO publications, Directory of open access journals, subject heading lists, etc. is also provided for easy access.

4.2.1.10. Free trial access

Links to various free trail access to new electronic products from various aggregators and publishers is provided through university website to get feedback regarding that product.

5. CONCLUSION

E-resources have been extensively used as a part of the research programes. E-learning environment has opened up new avenues for libraries to blend their traditional resources as well as services with electronic ones to meet the growing needs of wider clientele. The libraries are transforming and getting modernized. Librarians have to play on important role to maintain the piousness in the e-learning environment by gradually mastering the technological skills. So it has become necessary for the library professionals to gear up for this challenge by developing digital library, portals, blogs, courseware, etc. in order to provide enhanced access to resources and services. E-learning could be a powerful tool for lifelong learning for workplace employees and will help to stay ahead in competition. Thus by adapting ourselves and our libraries to the ever-changing environment, we can make the academic and other research libraries as centres of resources.

निष्कर्ष

ई–संसाधनों को व्यापक रूप से अनुसंधान कार्यक्रमों के भाग के रूप में उपयोग किया गया है। ई–लर्निंग परिवेश ने पुस्तकालयों के लिए बड़ी संख्या में ग्राहकों की बढ़ती जरूरतों को पूरा करने के लिए अपने पारंपरिक संसाधनों तथा साथ ही सेवाओं को इलेक्ट्रानिक संसाधनों के साथ मिश्रित करने हेतु नए अवसर उत्पन्न कर दिए हैं। पुस्तकालयों का रूप बदल रहा है और वे आधुनिक हो रहे हैं। पुस्तकालयाध्यक्षों को धीरे–धीरे प्रौद्योगिकीय कौशलों में दक्षता प्राप्त कर ई–लर्निंग परिवेश में शुचिता बनाए रखने के लिए महत्वपूर्ण भूमिका निभानी है। अतः, पुस्तकालय प्रोफेशनल्स के लिए यह आवश्यक हो गया है कि वे संसाधनों और सेवाओं की अधिकाधिक उपलब्धता प्रदान करने के लिए डिजिटल पुस्तकालय, पोर्टल, ब्लॉगों, पाठ्यक्रम सामग्रियों इत्यादि का विकास कर इस चुनौती के लिए तैयार हो जाए। ई–लर्निंग कार्यस्थल पर मौजूद कर्मचारियों के लिए जीवनपर्यंत शिक्षा प्राप्ति हेतु एक सशक्त साधन हो सकता है और उन्हें प्रतिस्पर्धा में आगे रहने में मदद करेगा। अतः, अपने आप को और अपने पुस्तकालयों को लगातार बदल रहे माहौल के अनुकूल बनाकर, हम शैक्षणिक और अन्य अनुसंधान पुस्तकालयों को संसाधनों के केन्द्र बना सकते हैं।

REFERENCES

1. Annual Report (2013-14). Punjab Agricultural University, Ludhiana.
2. Arma, William Y. Digital libraries. New Delhi : Ane Books,2005. 143p.
3. Bell, A. The internet : a new opportunity for information specialist. Information outlook, 1997. pp.33-36.
4. Gurdev Singh. Digital libraries and digitization. Ess Ess Pub, 2011. 666p.
5. Medhurst, J. Do or Die: The librarians in the 21st century. Management Information,1995. **2(9),** pp. 30-31
6. Parmar, Seema, Pateria, Rajive & Bhanu Partap. Information sources and services in electronic environment: A study of Nehru Library, CCSHAU, Hissar. Indian J of Agric lib Inf. services, 2013. **29(2)**, pp. 84-90.
7. Sreenivasulu, V. & Nandwana, H.B. Networking of agricultural information systems and services in India. INSPEL, 2001. **35(4),** pp.226-35
8. Vermani, Sanjeev Kumar. E-journals & library consortia with special reference to agricultural education. Int J of Lib Sc., 2013. **7(1)** pp.95-102
9. www.icar.org.in
10. www.krishiprabha.ac.in
11. www.pau.edu

सूचना और संचार प्रौद्योगिकी पर आधारित संसाधन और सेवाएं–छत्तीसगढ़ के इंजीनियरिंग कॉलेज पुस्तकालयों का अध्ययन

Resources and Services Based on Information and Communication Technology : A Study of the Engineering College Libraries of Chhattisgarh

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सारांश

यह पत्र छत्तीसगढ़ के इंजीनियरिंग कॉलेज पुस्तकालयों में सूचना और संचार प्रौद्योगिकी पर आधारित संसाधन और सेवाओं के उपयोग से संबंधित है। यह पत्र उक्त इंजीनियरिंग कॉलेज में सूचना और संचार प्रौद्योगिकी पर आधारित संसाधन और सेवाओं के संबंध में उनके उपयोग और प्रयोक्ताओं की संतुष्टि स्तरों की भी जांच करता है। यह अध्ययन इंजीनियरिंग कॉलेज के प्रयोक्ताओं के प्रश्नावली सर्वेक्षण पर आधारित है। इस अध्ययन में सूचना और संचार प्रौद्योगिकी पर आधारित संसाधन और सेवाओं के उपयोग में पुस्तकालय प्रोफेशनल्स की मदद समेत अन्य क्षेत्रों की भी जांच की गई। छत्तीसगढ़ के इंजीनियरिंग कॉलेज पुस्तकालयों में सूचना और संचार प्रौद्योगिकी अवसंरचना की स्थिति के बारे में और संचार एवं सूचना प्रौद्योगिकी के लागू होने से प्रयोक्ताओं की संतुष्टि के बारे में जानने का भी प्रयास किया गया। कुछ संभावित समाधानों से पता चला कि प्रयोक्ताओं के अधिकांश प्रतिशत द्वारा प्रयुक्त संसाधन ई–मेल और वाइड एरिया नेटवर्क्स थे। विद्यमान आईसीटी आधारित संसाधनों और सेवाओं में सुधार के लिए कुछ उपाय भी सुझाए गए हैं।

ABSTRACT

This paper deals with the use of resources and services based on information and communication technology in the Engineering college libraries of Chhattisgarh. This paper also examines the utilization and satisfaction levels of users with respect to the resources and services based on information and communication technology in the said engineering college. The study is based on a questionnaire survey of the engineering college users. The study also investigated further areas including library professional's help in the use of information and communication technology based resources and services. An attempt has been made to know about the status of information and communication technology infrastructure in the Engineering college libraries in Chhattisgarh. User satisfaction with the application of information and communication technology. Some possible solutions revealed resources used by the larger percentage of users were the e-mail and wide area networks. Some measures have also been suggested for the improvement of existing ICT based resources and services.

Keywords: Information and communication technology, wide-area-network, e-mail, resources, services, software

1. INTRODUCTION

Today the information explosion and recent advancements in information technology have created problems in procuring organizing and disseminating information for library managers and the end users with this complexity and tremendous pressure of users for better and quality services have forced the librarians to find solutions for efficient and effective management of their libraries, despite resources and service center. The availability of right information at the right time and in the right form is of utmost importance to users for their knowledge and developmental activities.

Developments in Information and Communication Technology (ICT) have greatly changed the methods of information handling. ICT has long standing influence in almost all areas of human activity. The applications of ICT facilitate easy and instantaneous access to information. It provides opportunites for libraries and information centers to widen the scope of their resources and services to increase their significance within the organization they serve. These factors clearly reinstated the fact that application of ICT in the libraries is imperative for the successful execution of the various academic and research commitments of the institutions of higher education.

2. SIGNIFICANCE OF THE STUDY

ICT has become an integral part of our day-to-day activities. It has not left any area untouched, library and information centers are an exception to this. The library and information centers play a vital role in providing right information to the right users at the right time in the right manner. ICT assists library professional provides value-based,

qualitative information services to its users. Introduction and adoption of ICT is inevitable for the benefit of the library professionals. The name and fame of any institution/ library and information centers depend upon its sound ICT infrastructure it has. Looking in at the need of the hour the researcher has undertaken this study

Chhattisgarh is the leading state in the country for the development and production of engineering and technology field. Engineers of the state have always in demand worldwide for their quality and intelligence. These Engineers are produced from quality educational institutions in the state and library & information centers have an important place in the educational system in the state. No research study conducted to assess the ICT infractructure in engineering colleges especially in Chhattisgarh which is considered as the backward state even though it has a rich amount of natural resources The main purpose of this study is to understand the possible areas where the application of ICT is made as a part of overall improvement in the engineering college libraries users information and communication technology based resources and services.

It is relevant and essential to about the status/position of infrastructure in the engineering college libraries users ICT-based resources and services. This study provides current sate-of-the-art of infrastucture in the engineering college libraries.

3. OBJECTIVES
1. To assess the current sate-of-the-art infrastructure in the engineering college libraries in chhattisgarh users information and communication technology based resources and services.
2. To compare the engineering college libraries in chhattisgarh users information and communication technology based resources and services.
3. To assess the contemporary use of electronic information resources and services in the engineering college libraries in Chhattisgarh.
4. To highlight the significance of campus networking for enabling the optimum utilization of Internet sources and services.
5. To suggest measures for improvement in the existing systems.

4. SCOPE AND LIMITATION OF THE STUDY
The study was carried out only in the state of Chhattisgarh. At the time of survey, 51 engineering college libraries in Chhattisgarh It use to be a tedious task to cover the entire Engineering college libraries all over in the Chhattisgarh due to vast geographical area and also study has to be carried out in time bound situation. The geographical area of Chhattisgarh State consisting of Three Region viz.,1. Raipur, 2. Durg and 3. Bilaspur.

5. METHODOLOGY
The nature of the present study required the survey of engineering college libraries which covers the entire Chhattisgarh region. Data was collected from this engineering college libraries in Chhattisgarh to examine the availability of ICT based resources and services.

6. RESULTS AND DISCUSSIONS
Table 1 despicts the distribution of questionnaires among different engineering college libraries in Chhattisgarh. It is learnt from the study that the Chhattisgarh State have three government engineering college libraries and fourty eight private engineering college libraries. Out of fifty one official questionnaires and 260 users questionnaire distributed to college libraries in Chhattisgarh, 40 (78.41%) official questionnaires and 240 (92.30%) users' questionnaire were given the answers. Out of total 51 engineering college libraries, Raipur region has 19 (27.45%) colleges, Followed by Durg region has 23 (39.21%) colleges, and Bilaspur region has 9 (11.76%) colleges.

Table 1. Distribution of questionnaires among different engineering college libraries

| Type | Colleges | No. of Questionnaires | | Total % |
		Distributed	Received	
Government	3	3	3	5.88
Private	48	48	37	72.54
Total	51	51	40	78.43

6.1 Infrastructural Facilities
In the questionnaire one of the key questions was the infrastructural facilities as this was to be utilized in the study further. As 90% answered this question so there was no logical obstacle to arrive at a conclusion. Total 86% of respondents agree that the electronic information resources facilities should be in central library and further to be continued in the same place and 14% of respondents disagree that the electronic information resources facilities should be near their teaching department as their department is bit far from the central library. The speed of the internet facilities were also studied through the questions as over all satisfaction was observed as 55% of the respondents were happy with speed of the internet.

6.2 Engineering College Libraries Users
Most users found the library collection satisfactory while stating that it was adequately. It has been found that among the eight institute's library surveyed, total Engineering college libraries users are (92.8 percent) students. 6.94% user' are amongst college staff in the college. In the lowest library users are researcher's in (0.25 percent) in the engineering college libraries of Chhattisgarh.

6.3 Use of Library Facilities
Table 3 shows that the use fluffiness of the received information technology based services in engineering college libraries in Chhattisgarh. This was intended to

Table 2. Users of various categries

Nomenclature	Quantity	Percentages (%)
students	16900	92.80
Staff	1264	6.94
Researcher	47	0.25

study as engineering college libraries budgeting on the electronic information resources and all these should have asked to study this feature. The questions were meant to study with 8 point scale. Those have agreed to the usefulness of the received information resources are as follows: 76.92% of the engineering college libraries in Chhattisgarh under the study agreed in user by Internet, very few 3.85% of the engineering college libraries in Chhattisgarh use the Inter Library Lone facilities and other resources is a average percents use by the engineering college libraries in Chhattisgarh.

Table 3. Use of the library facilities

Nomenclature	Yes	% of Yes	No	% of No
Internet	40	76.92	12	23.08
Wi-Fi	21	40.38	31	59.62
WWW	35	67.31	17	32.69
Library Portal	31	59.62	21	40.38
Software	21	40.38	31	59.62
Book Bank	35	67.31	17	32.69
Inter Library Lone	2	3.85	50	96.15
Library Opened on Holidays'	14	26.92	38	73.08

6.4 Use of Electronic Information Resources

In the present study 21 questions through questionnair were asked to know the use of electronic information resources. For this five point scale was used. It is observed that in circulation section 66% in used of Information technology based services, 47% is searching the used of Information technology based services, 64% used in a Internet & reprography services in the engineering college libraries in Chhattisgarh. A few percentages are used in periodical section and Cataloging Section serially 29 and 35% used in the engineering college libraries in Chhattisgarh.

Table 4. Use of electronic information resources

Nomenclature	% of Yes	% of No
Circulations Section	66.07	33.92
Searching Section	47.32	52.67
Periodical Section	29.46	70.53
Cataloging Section	35.71	64.28
Internet	64.28	35.71
Reprography Section	64.28	35.71

6.5 Priority of Study Material in Users

Table 5 shows that the use fluffiness of the received information technology based services in engineering college libraries in Chhattisgarh. This was intended to study as engineering college libraries budgeting on the electronic information resources and all these should have asked to study this feature. The questions were meant to study with 8 point scale. Those have agreed to the usefulness of the received information resources are as follows: 61% of the users under the study agreed in user by Books, 22% of the users use the internet and other resources is a very low percents used by the user's.

Table 5. Study material in users

Nomenclature	Preference of the percents (%)	No of users
Books	61	305
Journals articles	4	20
Conference proceedings	2	10
Internet	22	110
Bibliographies	3	15
Encyclopedias	1	5
Project report & thesis	0	0
News paper clippings	7	35

6.6 View on the Study Materials

Table 6 exhibits the consolidated statistics projects out of the study. It is clear now, the respondents representing all the categories of information users rely upon internet facility for the purpose of accessing information, contacting experts and communinicating with fellow professionals. The data reveal that 40% of the respondents have relies on internet for availing e-mail facility in the satisfied. 22.32% of the respondents have relies on internet for availing e-mail facility in the moderately satisfied. 16% of the respondents have relies on internet for availing e-mail facility in the highly dissatisfied. 15% of the respondents have relies on internet for availing e-mail facility in the dissatisfied and a few 7% of the respondents have relies on internet for availing e-mail facility in the highly satisfied. (HS= Highly Satisfied, S= Satisfied, MS= Moderately Satisfied, DS= Dis-Satisfied and HDS= Highly DIS-satisfied).

Table 6. Level of satisfaction

Nomenclature	HS (%)	S (%)	MS (%)	DS (%)	HDS (%)
Books	16.07	43.75	26.79	13.39	0.00
Journals articles	5.36	38.39	26.79	23.21	6.25
Conference proceedings	1.79	30.36	27.68	26.79	13.39
Internet	6.25	40.18	22.32	15.18	16.07
Bibliographies	1.79	37.50	32.14	19.64	8.93
Encyclopedias	8.04	43.75	21.43	17.86	8.93
NPC	41.07	39.29	8.93	9.82	0.89

7. FINDINGS AND SUGGESTIONS

At present there are several bottlenecks for the proper development in order to cope up with emerging modern technology. These constraints can be sorted out and the libraries must be empowered to perform their role efficiently and effectively. The following are some of the suggestions given for the improvement of Engineering college libraries in Chhattisgarh for users Information and Communication Technology based resources and services.

Library automation not only saves time of the users but also avoids duplication of work. Keeping in view the different cons of the concept a question was raised about the status of library automation. A discouraging situation was found from the study that majority of the libraries have not automated their libraries and few libraries are still in the process of automating their libraries. Hence, it is recommended that all the libraries should automate their libraries and follow uniform standards for automation.

The study indicates that all the Engineering Colleges under the study are having Internet connectivity. Majority of the Engineering Colleges are having Internet connection through the Institutes/College Network and Wi-Fi. Hence, it is recommended that a separate connection for each and every library should be made mandatory for all the Engineering Colleges.

Today, due to the proliferation of information users are shifting their attention towards electronic information resources and services. Users expect everything (information) to be available online and full-text. It is observed from the study that majority of the libraries are not subscribing e-journals/e-databases their libraries. Therefore in this context it is recommended that all the libraries must take the membership of INDEST to help out the teaching and research fraternity.

A pathetic situation was found from the study that all the Engineering Colleges lack basic Hardware and Software infrastructure. Few libraries were interviewed which reveals that libraries are given least importance compared to other departments Hence, it is recommended that minimum 10 to 15% of the total institutions budget should be allocated to the library department as recommended by Kothari commission (1964-66) for the libraries.

Libraries of engineering college in Chhattisgarh should subscribe more e-journals and e-databases. Some orientation programmes should be organized by the engineering college libraries in Chhattisgarh at regular intervals so that the maximum users can improve their excellence or proficiency in the use of the electronic information resources.

The qualified information technology expert staff should be appointed to provide the expert guidance to users about the electronic information resources.

Efforts should be made to increase the speed of the electronic information resources access and shorten the time it take to view and download the electronic information resources.

Steps should be taken by the library to orient the engineering college libraries in Chhattisgarh to use electronic information resources for searching more effectively.

8. CONCLUSION

The fast growth of information and communication technology, and particularly the Internet, has changed traditional methods of research, storage, retrieval and communication of information. Now a day's internet has emerged as the most powerful medium for storage and retrieval of accessory information. The present study observed that majority of users are not aware of electronic information resources. In this connection library administrator, may take initiatives to improve the information searching on the internet among the users of engineering college libraries in Chhattisgarh.

BIBLIOGRAPHY

1. Adams, J.A. & Bonk. S. Electronic information technologies and resources: use by university faculty and faculty preferences for related library services. *Coll. Res. Libr.,* 1995, **56**(2), 119-231.

2. Chowdappa, N. Impact of electronic information sources on the academic users in mysore: an analytical study. *SERLS J. Info. Manag.* 2009, **46**(2):155-162.

3. Kaula, P.N. Information and communication technology: Impact and challenges. Association of Indian Universities. New Delhi (2000): 20-31.

4. Khaiser, Nikam & Pramodini, B. Use of e-Journals and databases by the academic community of University of Mysore: A survey. *Annals Lib. Infor. Studies,* 2007, **54**(1), 19-22.

5. Kumar, R.P. Application of modern technologies in helth science libraries in India: a survey. *Aslib Proceedings,* 1993, **45**(3), 63-67.

6. Ramesh, Babu & Gopalakrishnan, S. Internet: A survey of its use in Chennai (India). Malwad, N. M. and others (Ed.). Towards the new information society of tomorrow: Innovations, challenges and impact, 49th FID conference and congress. New Delhi: 1998; 111-9-111-13.

7. Reddy, Y. Nagi. & Yakub, Ali. Information technology based services in a university library: A user satisfaction survey. *Annals Lib. Infor. Studies,* 2006, **53**(1), 15-18.

8. Sharma, S. Information technology in special library environment. *DESIDOC Bull. Info. Tech.,* 1999, **19**(6), 17-30.

9. Singh, R.K.J. Use of internet based e-resources at Manipur university: a survey. New Delhi: Ess. Ess. Pub., 2009, p-52.

10. Singh, S.P. Computer epplications in Indian intitutes of technology library. *Electronic Library,* 2001, **19**(2) 92-101.

11. Tilwani, T. D. & Kumar, S. Information use pattern of social scientists from web-based information resources: a pilot study. *ILA Bulletin,* 2007, **43**(4),16-24.

जगरुकता, पहुंच और इलैक्ट्रॉनिक सूचना संसाधनों का उपयोग : प्रकाशित साहित्य का अवलोकन
Awareness, Accessibility, and use of Electronic Information Resources : An Overview of Published Literature

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सारांश

प्रस्तुत पत्र सूचना के इलैक्ट्रॉनिक संसाधनों (ई आई आर) से संबंधित उनके प्रिंट समकक्षों की तुलना में कुछ महत्त्वपूर्ण मुददों के बारे में पता करने और एक तस्वीर बनाने का प्रयास है। यद्यपि कश्मीर विश्वविद्यालय के इकबाल पुस्तकालय द्वारा उपलब्ध प्रिंट और सूचना के इलैक्ट्रॉनिक संसाधनों भर में एक मुक्त पाठ की खोज आयोजित करके प्रकाशित साहित्य को इक्कठा करने के लिए खोजपूर्ण विधि को अपनाया गया है। उनके पुस्तकालयों में सूचना के इलैक्ट्रॉनिक संसाधनों ई आई आर एस के अस्तित्व के बारे में विकासशील देशों के उपयोगकर्ता का जागरुकता स्तर अभी भी काफी कम है। उपयोगकर्ताओं को जानकारी की उपलब्धता अब बहुत अधिक हो चुकी है। जानकारी की उपलब्धता सुलभता अब कई तरीकों से बढ़ चुकी है और संपन्नता और असंपन्नता के बीच के अंतर को पूरा करने के प्रयास किये जा रहे हैं। सूचना के इलैक्ट्रॉनिक संसाधनों ईआईआर का उपयोग करने में आत्मविश्वास का स्तर दिन प्रति दिन बढ़ता जा रहा है लेकिन उपयोगकर्ताओं को एक खोजपद के जबाब में प्रतिक्रियाओं की एक बड़ी संख्या को आलिंगन करना जैसा महसूस हो रहा है। पुस्तकालय स्टाफ को प्रयोक्ताओं की साक्षरता जानकारी बढ़ाने में एक महत्त्वपूर्ण भूमिका निभानी है। सूचना के इलैक्ट्रॉनिक संसाधनों ईआईआर का उपयोग करने में स्नातकोत्तर छात्र स्नातक छात्रों की तुलना में अधिक निपुण प्रतीत लग रहे हैं। उपयोगकर्ता सूचना के इलैक्ट्रॉनिक संसाधनों ईआईआर को मुद्रित रूप में उपयोग करना ज्यादा पसंद करते हैं। उपयोगकर्ताओं की संतुष्टि के स्तर को काफी हद तक बढ़ाया जा चुका है। समस्याए को सुलझाना अभी भी बाकी है और प्रस्तुत पत्र में समेकित संभव उपचारों को प्रकाष मे लाने के लिए प्राथमिकता के आधार पर संबोधित करने की जरूरत है।

ABSTRACT

This paper is an attempt to reveal and sketch out a picture about some core issues related to electronic resources of information (EIRs) as compared to their print counterparts. Exploratory method has been adopted to collect the published literature while conducting a free text search across the print and electronic resources of information available through Iqbal Library of the University of Kashmir. The awareness level of the users of developing countries about the existence of EIRs in their libraries is still low. The information has become much more available to users. The accessibility has increased manifolds and efforts are on to bridge the gap between information haves and have-nots. The confidence level towards using the EIRs is increasing day by day but the users feel embraced on retrieving a huge number of responses in response to a search term. The library staff has to play a significant role in enhancing the information literacy of users. The postgraduate students seem to be more adept in using the EIRs as compared to undergraduates. The users seem to prefer using EIRs over that of print form. The level of user satisfaction has enhanced to a large extent. A host of problems are still there and need to be addressed on priority, in light of the possible remedies consolidated in this paper..

Keywords: Electronic information resources, electronic sources, electronic information sources, e-resources, information literacy, information skills

1. INTRODUCTION

It is observed that there has been a continuous change in the medium used for storage and communication of information. Paper used as medium for recording the information; using natural pigments or ink with chemical base as a writing material; and written with the help of pencil, pen, typing machine, printers etc. through manual, mechanical, semi-automated or automated means is called as print form of documents. Whereas when information is recorded in analogue (wave form: crests and troughs such as audio/video) or digital (bits, i.e., pits and grooves or zeros and ones or off/on mode) form on electromagnetic cards, fiches, films, tapes, sheets, floppies, discs, drives, chips, etc.,

recorded with the help of electromagnetic machines, electronic typewriters, electronic tools, computers, other digital devices; it is called as electronic form of documents.

Due to advent of a variety of electromagnetic, electronic and digital equipment/devices the process of recording and communicating the information is under a shift from print form to electronic form. It has started by 1725, Basile Bouchon used perforated paperloop in a loom to establish the pattern to be reproduced on cloth. Joseph Jacquard used punched cards in 1801 as a control device for the more automatic Jacquard looms, which met with great success. Such cards were also used as an input method for the primitive calculating machines of the late 19th century. The version by Herman Hollerith, patented on June 8, 1887 and used with mechanical tabulating machines in the 1890 U.S. Census, was a piece of cardboard about 90 mm by 215 mm, with round holes. Herman Hollerith (1860-1929) is widely regarded as the father of modern automatic computation. He chose the punched card as the basis for storing and processing information and he built the first punched-card tabulating and sorting machines as well as the first key punch, and he founded the company that was to become IBM. Hollerith's designs dominated the computing landscape for almost 100 years. (http://cs-exhibitions.uni-klu.ac.at/index.php?id=315). This has gained remarkable momentum since 1970s. The availability of information resources in electronic form has laid a significant impact on library users. It has lead to a change in the state of readers so far as their level of awareness and competence in use is concerned. At the same time the existence of EIRs in collaboration with ICT has lead to an enhancement in the visibility, accessibility and usability (quantum of use) of the information as compared to print era. The information seeking behaviour of users has also recorded an evident change.

This paper is an attempt to reveal and sketch out a picture about some core issues related to EIRs as compared to their print counterparts, as:

- The state of awareness the contemporary user has about the existence and availability of EIRs;
- How competent the users are in their use and the level of comfort the users feel in using EIRs;
- The magnitude of visibility and accessibility of EIRs.
- The quantum of use.
- Problems faced by the end users in identifying and using the EIRs. and
- Recommendation of researchers to eradicate the problems.
- The user preference & satisfaction.

While adopting an exploratory method an attempt has been made to discover relevant research findings existing as published body of research. J-Gate a journal gateway to 7900+ journals (http://jgateplus.com/search/footer-html/FAQ.jsp#How many publishers are indexed in J-Gate?) and EmraldInsight an online information database with around 350+ Management and Library & Information Science eJournals / eBooks were scanned for the purpose. This database includes 23 core Library and Information Studies journals and 3 eBook Series. The subject terms used to search the relevant literature were: 1. Electronic Information Resources; 2. Electronic Resources of Information; 3. Electronic Sources of Information; 4. Electronic Information Sources; 5. eResources; 6. Awareness; 7. Information Literacy; 8. Access; 8. Accessibility; 9. Use; 10. Usage; 11. Information Skills.

2. AWARENESS OF USERS AND COMPETENCE IN USE

The cost of information resources is quite huge and it is very important to ensure maximum utilisation by the end users. An information resource can be used to its maximum only when the users are aware about its existence and availability and very much skilled to use it at their convenience. As such it is very essential to know the state of awareness of the end users. The awareness of users is as important as the richness of the collection. In order to measure the awareness level of users about the EIRs, an attempt has been made to seek answers to two basic questions: 1. Are the users aware about the availability of e-resources and online information services? and 2. What needs to be done and is being done to enhance the awareness of users? The answers as extracted from the published body of literature available to the surveyor are as follows:

Ninety five percent of library users in Indian Institute of Technology (IIT), Delhi are aware of electronic information services (EISs) and able to make most use of them[1]. Most of the research scholars in Aligarh Muslim University and Banaras Hindu University, the two reputed Indian universities are aware of the availability of e-journals[2]. The social scientists working in National Social Science Documentation Centre (NASSDOC) are aware of the e-resources (such as e-books, e-journals, e-encyclopedias, e-theses, CD-ROM databases, e-mail, internet and the OPAC)[3]. Most of the users (83%) in a Nigerian university library are aware of the Internet services and that student's own interest and the efforts of librarians are the main factors for bringing about this awareness[4]. "Majority of the library users felt that their level of computer literacy was average or above average, and expressed a need for training in the use of the electronic information sources (EISs). The respondents preferred workshops, hands-on training, on-screen presentations and the need-based support to self-help guides/hand-outs and

training by central/state government."[5]

On the other hand, Long[6] finds that "respondents were not aware, nor do they use, most of libraries' electronic information resources"(p. 258). The awareness and utilization level of medical students using electronic resources of the integrated digital library portal (IDL) of the three universities in Iran are lower than the average and those who are not aware of the existence of the IDL portal use general search engines to meet their information needs. The authors found that respondents were not well aware of the utilization of searching strategies[7]. Anunobi[8] found that some students were not aware about the Internet and could not use it and those aware about its use were in a position to avail facility of their own. The general practitioners, practicing nurses and practicing managers in Nottingham and Rotherham, UK, have low ability in usage of the libraries. At an average 60% of the respondents opined that the lack of training was the main barrier to using Internet and databases and wanted that training be provided to impart the necessary skills. The study identified that training, if provided, would increase the use of electronic resources further[9].

The findings of these works reveal a blurred image, i.e., while some researchers found that users are very much aware of the existence of EIRs, some found that their awareness level is average, and some found that they are totally unaware. However, it is clear that Library and Information (LIS) professionals require to organise awareness campaigns and conduct orientation/training programmes on regular basis to make aware the new generation users and update/enhance awareness level of seniors.

3. ACCESS AND ACCESSIBILITY

The web is becoming hegemonic as an interface for information particularly that of an academic nature. Individual articles can be found scattered around the web on authors' own web sites. Scholarly journals are increasingly available online either in subscription-based publishers' digital libraries or posted in publicly accessible web sites.[10] Electronic information resources have got the beauty of being searchable from more than one approach, and are accessible to users both locally and from remote locations.[11] Many research scholars are consulting e-journals from their departmental labs and computer centers[12]. Dong[13] found that in the internet age, channels of obtaining information are a mixture of modern and traditional ways as well as formal and informal methods. Among these channels, search engines are the most commonly used tools. However, majority of the students (93.3%) were not facilitated to use Internet services[14]. The results achieved in a study in the year 2005-06 in four prestigious Institutes

of Engineering and Technology of India estimated that the information provided on consortia basis will expand access to electronic databases.[14] The requirement that "information is easily accessible to all the users, can be met by integrating electronic publications into the library services menu by developing campus-wide network, with adequate number of terminals. Hence, the traditional mode of access has to be transferred to deliver services through non-traditional approach."[15]

4. USABILITY AND USE

A number of issues are related to the use and usability of electronic information resources ranging from the quantum of use, modes of use, purpose behind use, problems faced in use and the end user satisfaction. A glimpse of the findings relevant to core concept of use of EIRs and the attributes thereof is given under respective headings as under:

4.1 Quantum of Use

Effort has been made to collect and analyse the facts relevant to the quantum of use of EIRs, in order to measure the visible difference between EIRs and its counterpart i.e. the print form of resources, so far as the magnitude of their use is concerned. The ultimate purpose of this section is to explore and substantiate the current trend, i.e., whether present day users prefer to use the print or electronic form of the information resources. How do they use them? How competent they are in its use? Are the other curiosities that will be attempted to find the answers to. Review of a portion of published literature deemed most relevant by the investigator is presented here:

The access and use of e-information is an important component of research activities for scientists. The qualitatively and quantitatively developed e-collections seem to have surpassed the conventional resources due to their advantage of fast accessibility. Owing to their flexibility the EIRs enable the users to access the information from many angles. Title field, simple search techniques and self-taught methods are used to access the e-information. E-journals are most preferred e-resources and scientists are very highly satisfied with the retrieved e-information[16]. The results achieved in the year 2005-06 in four prestigious institutes of Engineering and Technology of India by Verma and Baljinder Kaur[17] demonstrate that an academic library can become user centered in the electronic environment. It was found that users are very well accepting electronic information resources. The problems faced by them are lack of training and slow downloading. The electronic resources have created a positive hope among the research community of university libraries of Karnataka and thus established an optimistic atmosphere[18].

With a purpose to present and discuss the problems LIS postgraduate students face in accessing e-resources in Makerere University, Uganda, Okello-Obura[19] found that the respondents have positive attitudes towards e-resources utilization, however face varied problems in using e-resources. Similar to other studies, the papers written by Chirra & Madhusudhan[20] and Gupta[21] also reported that the lack of training and internet facilities are the most common problems in using e-journals in the Indian universities. Warraich and Kanwal[22] while studying the Pakistani Higher Education Commission (HEC) National Digital Library (NDL) databases found that younger professionals showed more interest in the use of the digital databases and a majority of users accessed these databases through the HEC web site. Gowda and Shivalingaiah[17] revealed that there is a gap between need and availability of electronic resources in university libraries. A major survey of literature was carried out by Tenopir[22], he analysed the results of over 200 studies of the use of electronic resources in libraries published between 1995 and 2003. Main finding of these studies indicate that electronic resources have been rapidly adopted in academic areas but the behaviour of users varies from discipline to discipline. The findings reported by Hernando and Trinder[23] under SWICE pilot project report shows combined use of EIRs, whether accessed from the library, from home or from workplace, is higher than that of print form of books and journals. Deng[24] found that the use of electronic resources in Australian universities is quite common. A majority of respondents believed that electronic resources are useful. The user's awareness and quality of information available are important factors affecting the use of electronic resources. It was also found that users with different purposes differed significantly in their access and use of electronic resources.

Wilson[25] found that Monash library users in Australia are highly dependent on electronic resources, majority of the respondents love databases, e-journals and e-books, but 27% of users find them confusing or frustrating to use. Another key study in this field by Barllan and Fink[14] reveals that the usage of electronic journals increases with time and the variables such as age and/or academic position is inversely related to the use of electronic format and journals. There is a decrease in the use of printed journals as users prefer to use the electronic format more. As the time passes many users access the electronic format more frequently. Verma and Baljinder Kaur[14] while conducting a survey in four prestigious institutes of engineering and technology of India found that the users are accepting electronic information resources very well and that information provided through consortia will ensure better utilisation of electronic databases. According to Swain and Panda[27] the internet-based e-resources are better used as compared to offline CD-ROM databases in business school libraries of India's Orissa state. However, access to some specialised and key online databases is confined to only a few B-school libraries of the state. The library users with ample skills of computer and information science tend to make greater use of electronic information resources as compared to those having no or less competence in using the technology.[28] The usage of electronic library services increases with the passage of time it is kept available to its patrons for use. The more a user finds opportunity to use it, the more s/he becomes familiar with its use and the more will be its usage[29].

Zabed Ahmed[30] reports that "While the use of electronic resources by students in developed countries is well-recognized (see, for example, Tenopir[22] for a review of earlier studies and recent research by Gray[31]), their use and adoption by universities in developing countries are still mixed." Zha, Li and Yan[32] while surveying Chinese university library with a purpose to examine and compare ease of use, usefulness and usage of electronic resources in Chinese versus English languages found majority of users perceived that electronic resources in Chinese language as compared to English are easy to use and useful and as such their frequency of use is higher.

"A majority of the surveyed academic staff and the students found the internet to be very useful. Internet resources mostly used by both groups were e-mail and the World Wide Web (WWW). Search interfaces were used for looking for research information. It was discovered that the users, however, were not given adequate user education to enable them make use of the internet resources available[4]." E-mail, among the ICT-based resources, proved to be the highly used resource in Special libraries in Kerala[33]. Google and Yahoo! are the most frequently used search engines[27]. "Despite many technological developments and growth in the variety and number of information access channels, users still find it difficult to use the information services"[34] The students in Mazandaran University got acquainted with use of databases more through the library web site. Also most of the students used the search engines, especially the directories and search super-engines to retrieve information (Darzi as cited in Anaraki & Babalhavaeji[7]).

According to Crawford and Daye[35] students find CD-ROMs with a less intuitive interface less user friendly; only 18% of the respondents under study used CD ROMs and 13% used online databases. Since the libraries have started subscribing to e-journals there is an increase in the use of e-journals and decrease in the use of print journals by faculty and graduate students. Rogers[36] while analysing the data collected from the Ohio State University states that the number of e-journals has increased from two hundred to more

than three thousand. The radical changes in use of information resources are taking place as the scholars and researchers have become more comfortable and familiar with the resources available through web[37].

The findings in the study conducted by Romanov and Aarnio[38] reveal that use of electronic resources shows a non-homogeneous trend among students, the authors observed that 40 per cent of the respondents of their study were non-users of full-text articles. The journal usage trend among PGs is more than UGs[39]. The report of the South West Information for Clinical Effectiveness (SWICE, UK) pilot project notes that log-ins to the service showed a peak of usage from Monday to Friday between 8 am to 6 pm, however also asserts significant usage beyond these hours and reveals that all professional groups are accessing the service[23].

Raza and Upadhyay[12] measured the usage of e-journals by the researchers at Aligarh Muslim University, India and found that most researchers equally use both printed and electronic journals. They noted that lack of training and slow download speed were the major problems in using e-journals. Baro, Endouware and Ubogu[40] found the undergraduate students in the College of Health Sciences in Niger Delta University were mostly relying on a mixture of print and electronic sources of information like that of textbooks, medical journals, the internet, colleagues, and the Nigerian National University Commission's virtual library for information. They rarely use electronic resources such as MEDLINE, HINARI, the Cochrane Library, and EbscoHost for various reasons.

Al-saleh (as cited in Anaraki & Babalhavaeji[7]) while investigating three universities of Saudi Arabia in the year 2004, realized that only half of the students used the electronic resources while the rest preferred to use books and printed documents. Dadzie[41] found that the use of computer for searching information was high. The usage of some Internet resources was also found to be very high, while the use of scholarly database resources was quite low due to inadequate information about the existence of these library resources. It was found that the resources of Pakistan HEC NDL are underused. HEC NDL needs to develop a promotional strategy and a feedback mechanism with the assistance of LIS professionals to improve its usage, because they have better knowledge of the information needs of their potential clients[21]. Majid and Tan[42] in their study of computer engineering under-graduate students in Nanyang Technological University in Singapore discovered that the use of these databases and electronic journals was quite low among the students and more than one-third of the respondents had never accessed these databases. The study carried out in Mazandaran University by Darzi (as cited in Anaraki & Babalhavaeji[7]), to investigate

the graduate students' ability in utilizing the federated information resources accessible to them, reveals that only half of the population under study was acquainted to some extent with the way of utilizing the online electronic databases.

Sujatha and Shivananda Murthy[5] in a pilot study carried out at the College of Fisheries, Mangalore, found that in spite of a wide variety of EISs available, many of these are not fully utilized by the academic community. This inability to effectively exploit these sources, among other factors, is generally attributed to lack of competence in the use of the library sources. A need was felt to conduct a study to ascertain the training needs of the academic community in the use of EISs. Ndinoshiho[43] in an African University observed that many electronic resources were not fully utilized by undergraduate nursing students. The main barriers identified were the shortage of computers, unreliable internet connections and lack of skills. Ani[44] found that although the Internet is extensively used by undergraduate students in Nigerian universities, the use of electronic resources such as the electronic journals and online databases by them was poor.

Despite some of the difficulties evident from the published literature as revealed above, the users prefer to use the electronic form of information resources as compared to those in print form. The studies substantiating this fact have been collected and placed as under:

The results of the study conducted by Raza and Upadhyay[12] show that 68.8 per cent of the respondents preferred to use online journals compared to 31.2 % who preferred to use print journals and 71.8 % who preferred to use printed books as compared to 28.27 % who preferred to use electronic books. E-journals are most preferred e-resources and scientists are very highly satisfied with the retrieved e-information[16]. Some recent studies such as, Chirra & Madhusudhan[19] and Gupta[20] also found that researchers preferred electronic rather than print journals. Gowda and Shivalingaiah[17] while studying the attitude of research scholars towards usage of electronic information resources in university libraries of Karnataka found that in general research scholars prefer print resources; however there is significant difference from discipline to discipline so far as the preference is concerned. Electronic information resources, especially online journals, are considered as a commodity for an academic institution. Users prefer to use the electronic form of journals rather than print[45,46].

5. PROBLEMS IN ACCESS AND USE

On analysing the facts and findings of various researchers reported through their studies, it is concluded that about 16 factors are responsible for under-utilisation

of electronic information resources. The factors acting as impediments and hampering optimum use of EIRs as revealed by the covered research investigations are given as under:

- Lack of awareness of users about the availability of resources, as found by Adams and Bonk[47]; Baro,[40] *et al.*, Anaraki and Babalhavaeji[4], Dadzie[41], Nwezeh[4], Rehman and Ramzy[48].
- Limited number of browsing terminals in libraries for internet access, as revealed by Al-saleh (as cited in Anaraki & Babalhavaeji[7]), Anunobi[8], Ndinoshiho[43], Oduwole and Akpati[49], Zabed Ahmed[30].
- Low bandwidth subscription / low speed internet connectivity / slow downloading speed, as explored by Al-Ansari[50], Raza and Upadhyay[12], Verma and Baljinder Kaur[14], Warraich and Kanwal[21], Zabed Ahmed[30].
- Deficiency or non-availability of EIRs or lack of access to their full text, as stated by Adams and Bonk[47].
- Lack of searching/usage skills required for efficient search/use of EIRs, as reported by Anunobi82; Baro,[8] *et al*.
- Lack of training in usage of EIRs, as discovered by Adams and Bonk[47].
- Poor ICT infrastructure & application, as found by Kiplang'[52].
- Limited Internet access in terms that all users do not find opportunity to access Internet and if found can use it for an insufficient span of time, Raza and Upadhyay[12].
- High cost of access; as noted by Vicente,[51] *et al*.
- Power outages/electricity failure/fluctuation as revealed by Oduwole and Akpati[49].
- Lack of time or Unwillingness to use the resources regularly, as explored by Nwezeh[4].
- Low satisfaction level of user and consequent disappointment as note by Zabed Ahmed[30].
- Low priority of libraries within their organization as seen by Al-Ansari[50].
- Lack of remote access to enable users to use the resources on anytime anywhere basis as reported by Al-Ansari[53].
- Information over load and deficiency of time at the hands of user as found by Al-Ansari[53].
- Challenge of locating specific and qualitative citable stuff in the era of information explosion as indicated by Baro,[40] *et al.*
- Less user friendliness of interfaces providing access to EIRs, as reported Warraich and Kanwal[21].
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6. REQUIREMENTS TO PROMOTE USE

Electronic resources of information have got a lot of advantages as compared to the print form, however, a bunch of factors stand as barricades/impediments hampering optimum utilisation of these resources. Humankind has ever been struggling to find solutions to their problems or at least find a remedial to lead a comfortable life in common. Same is the case here, the perusal of the available literature shows that researchers have been pondering / struggling to find solutions to eradicate the problems faced by users in accessing and using the EIRs.

Based on their findings the researchers have given some valuable suggestions/recommendation which they deem can act as solutions to the problem of under utilisation of EIRs. After analysing these findings an inventory of the basic requirements needed to be taken care of for promoting efficient use of EIRs, with author support against each, has been prepared and given below. The inventory has been prepared in a logical sequence.

- Subscriptions to sufficient EIRs and provision of access to their full text[54].
- Develop an automated library system[16].
- Establish improved IT infrastructure[54].
- Library staff must realize and fulfill their responsibilities[55].
- Improve library services to promote readership and ensure optimum utilisation of EIRs[55,16]. Provide high bandwidth to overcome poor network connectivity/provide fast internet access and thus improve download speed[56].
- Enhance awareness among users about availability and use of EIRs through orientation programmes[57-59].
- Conduct regular orientation and training programmes for users and library staff in order to impart skills about use of ICT tools/techniques among them and ensure effective searching & use of EIRs[60-64].
- Provide article alert and electronic document supply services[65].
- Provision of remote access on anywhere and anytime basis[66].
- Develop ability among users to evaluate quality of information retrieved from web[4].
- Knowledge of web functionality and design[4]. Skills development in using discussion forums and chat rooms[4].
- Lead the youth from games console to EIRs and inculcate reading interest among them[56].
- Ban on the usage of social community[54].

7. USER SATISFACTION

"Satisfaction refers to the feeling of being pleased with results[67]."

The ultimate purpose behind provision of quality information sources and efficient library services is to meet the basic requirements of users and leave them

fully satisfied. Contemporary users have very high expectation and it proves very difficult to achieve the level and give them a feeling of highest satisfaction. An overview of the library user satisfaction as revealed by the published literature is as under:

Special libraries in Kerala were not in a position to extend the services up to the expectation of their users. A good number of the library users were not satisfied with the status of application of ICT in their libraries and indicated ''inadequate ICT infrastructure'' as a major reason for their dissatisfaction.[39] Zabed Ahmed[30] conducted a survey in two specialized public universities in Bangladesh, the results of the study show "that at all the students are not satisfied with the current level of university subscribed online resources" (p. 7). Balog and Plascak[54] in a study carried at the Faculty of Philosophy Library in Osijek, Croatia found that both students and faculty are least satisfied with library collection, computer equipment, interlibrary loan; library instruction, reading room and library holding layout, however are satisfied with librarians' friendliness and responsiveness. The authors also reveal that the overall satisfaction with library services is somewhat better among the faculty than among the students. The study reports that major causes for student dissatisfaction were lack of available materials in the library, faulty computer equipment and disruption of the internet service; whereas the faculty members want access to more online databases and more prompt interlibrary loan service. Moreover the authors substantiated the fact that the library meets the information needs of its users only to an average extent of 50 to 60 %, consequently the users turn to other information resources. Kannappanavar and Swamy[68] found that users in agricultural university libraries in South India are dissatisfied with audiovisual materials, CD-ROM databases, e-books, e-journals and feel that e-resources are totally inadequate. Many of the users at Goa University were not fully satisfied with status of EIRs because they faced difficulty in accessing their full text and lacked the required internet facilities[19]. "There is a clear sense among the British researchers that their needs are not sufficiently recognised in the configuration of information resources and services provided to them. Only small proportions of researchers think their library is too focused on providing resources and services for researchers. At the same time, 61 % of researchers either "disagree" or "strongly disagree" that their library is too focused on providing for the needs of researchers. Taken together, these responses suggest significant levels of dissatisfaction and a perceived imbalance between serving the needs of teaching and research[69]."

Research scholars at Kurukshetra University deem electronic resources as a highly reliable and satisfactory resource to meet their information needs. The e-resources are good & potential substitutes for conventional resources, if the access is fast, and more computer terminals are installed to provide enhanced browsing facility to e-resources[70]. E-journals are most preferred e-resources and scientists are highly satisfied with the retrieved e-information[16]. The users of electronic information resources at the Punjab University face many problems in retrieving and using electronic facilities, but they perceive that their work has become easier with technology[71]. A majority of users were satisfied with the e-resources available at the NASSDOC library[3] Seventy per cent of student and faculty indicated that they were satisfied with the coverage of the electronic resources at the St Augustine Campus Libraries of the University of West Indies[72]. Bhatt and Rana[73] revealed that though some problems were explored in using e-resources by engineering academics of Rajasthan, the majority of users were quite satisfied with using e-resources. Both students and faculty regard the strength of library collection; access to the collection; promptness of service, provision of Internet; librarians' competences & knowhow; their friendliness & responsiveness; availability when assistance is needed; service delivery time; OPAC; working hours; reading room; and computer equipment as the most important aspects of library services, from the satisfaction point of view[54]. Marriott[29] studying the impact of Medline on patient care concluded that there is a range of supporting evidences in published literature which reveal that "satisfaction levels of users of electronic library services that have been surveyed are uniformly high." The users of National Digital Library (NDL) databases of Pakistani Higher Education Commission (HEC) were more satisfied with electronic journals and were least satisfied with e-books[21].

8. CONCLUSION

It is evident from the published body of literature that awareness level of the users of developing countries about the existence of EIRs in their libraries is still low. As such there is a dire need to conduct user orientation-cum-training programmes and organise offline and online awareness campaigns. EIRs remain much more available to users and the chances of using the required information resources have increased, as more than one user can use a single resource simultaneously at a single instance. This however, depends upon the license model under subscription. The possibility of providing access to an un-imaginary large number of eJournals on consortia basis has also enhanced the availability of EIRs. The availability has also increased as also a good number of free of cost resources are available over Internet. The accessibility has increased owing to the fact that users can access

the EIRs available with their libraries all across the library/campus networks and even from outside their institutional boundaries through Internet and remote access option on anytime anywhere basis. The governments of developing countries have started to outreach to end users in remote areas by laying the optical fiber networks and provision of broad band connections on nominal charges, resulting in bridging the gap between information haves and have-nots. Moreover, due to slight decrease in the Internet access subscription charges libraries have started to subscribe to more and more bandwidth which has resulted in enhancement in speed of access and downloading, but the situation in developing countries is still not encouraging.

Though the users seemed to be a bit hesitant in using the EIRs in beginning, the confidence level is increasing day by day, resulting into a shift from print to electronic mode. The generation X students are becoming tech savvy and have started to use Internet of their own. But they feel embraced on retrieving a huge number of responses in response to a search term and at times feel disappointed. It is evident from the literature that libraries have to play a significant role in enhancing the information literacy of users. Moreover, the library staff needs to impart necessary skills among users in order to empower them towards adopting the appropriate search strategies and learning the advanced search techniques. The postgraduate students seem to be more adept in using the EIRs as compared to undergraduates; this is because they have comparatively more exposure to these resources and because the user orientation, training and publicity mechanism is well established in universities as compared to colleges. It is presumed that still half of the user population prefers print form of information resources, but the trend seems shifting fast towards electronic form. The users covered by the works under review seem to use the information mostly for educational and research purposes. The level of user satisfaction towards the library services has risen to a large extent. A host of problems are still there and researchers have charted down the possible solutions to these problems. The problems need to be addressed in light of the recommended remedies on priority both at Government level and through private-public partnerships

निष्कर्ष

प्रकाषित साहित्यों से स्पष्ट है कि उनके पुस्तकालयों में सूचना के इलैक्ट्रॉनिक संसाधनों ई.आई.आर.एस. के अस्तित्व के बारे में विकासशील देशों के उपयोगकर्ता का जागरूकता स्तर अभी भी काफी कम है। वैसे तो उपयोगकर्ताओं को अभिविन्यास–सह–प्रशिक्षण कार्यक्रमों का संचालन करने और

ऑफलाइन एवं ऑनलाइन जागरुकता अभियान के आयोजन करने की सख्त जरूरत है। सूचना के इलैक्ट्रॉनिक संसाधनों ई.आई.आर.एस. उपयोगकर्ताओं के लिए अधिक उपलब्ध हैं और आवश्यक जानकारी संसाधन उपयोग करने के अवसरों में वृद्धि हो चुकी है क्योंकि अब एक से अधिक उपयोगकर्ता एक साथ एक अवस्था में एकल साधन का भी उपयोग कर सकता है। तदापि, यह सदस्यता के तहत लाइसेन्स मॉडल पर निर्भर करता है। भागीदारी के आधार पर ई–पत्रिकाओं की एक अकाल्पनिक बड़ी संख्या के लिए सुलभता प्रदान करने की संभावनाओं ने भी सूचना के इलैक्ट्रॉनिक संसाधनों ई.आई.आर.एस. की उपलब्धता को बढ़ाया है। उपलब्धता भी बढ़ चुकी है क्योंकि संसाधनों की उपलब्धता भी अच्छी संख्या के रूप में इंटरनेट पर निशुल्क उपलब्ध है। सुलभता इस तथ्य के साथ बढ़ चुकी है कि उपयोगकर्ता अपने पुस्तकालयों के साथ उपलब्ध सूचना के इलैक्ट्रॉनिक संसाधनों ई.आई.आर.एस. का उपयोग पुस्तकालय/परिसर नेटवर्क भर में, यहां तक कि उनकी संस्थागत सीमाओं के बाहर किसी भी समय कहीं भी इंटरनेट के माध्यम से दूरस्थ पहुंच विकल्प के माध्यम से कर सकते हैं। विकासशील देषों की सरकार ने संपन्न और असंपन्नों के बीच जानकारी की खाई को पाटने में दूरदराज के क्षेत्रों में अंत उपयोगकर्ताओं के लिए ऑप्टीकल फाइबर नेटवर्क विछाकर और मामूली झुल्क पर ब्राडबैंड कनेक्षन के प्रावधानों के द्वारा हद से आगे तक जाना शुरू कर दिया है। इसके आलावा, इंटरनेट के उपयोग की सदस्यता में मामूली सी कमी की वजह से पुस्तकालयों ने बैंडविड्थ की सदस्यता को अधिक से अधिक लेना शुरू कर दिया है जिसके कारण इंटरनेट के उपयोग और डाउनलोड करने की गति में वृद्धि हुई है लेकिन विकासशील देशों में स्थिति अभी भी उत्साहजनक नहीं है।

हांलाकि उपयोगकर्ताओं को शुरूआत में सूचना के इलैक्टर्ऩैनिक संसाधनों ई.आई.आर.एस. को प्रयोग करने में संकोच सा लग रहा था, लेकिन आत्मविश्वास का स्तर दिन प्रति दिन बढ़ने के परिणामस्वरूप प्रिंट से इलैक्ट्रॉनिक मोड पर बढ़ता जा रहा है। एक्स पीढ़ी वाले छात्र तकनीकी प्रेमी होते जा रहे हैं और उन्होंने अपने स्वयं के लिए इंटरनेट का प्रयोग करना शुरू कर दिया है। लेकिन वे एक खोज पद के जबाब में प्रतिक्रियाओं की एक बड़ी संख्या को गले लगा रहे हैं और कई बार निराशा भी महसूस कर रहे हैं। साहित्यों से यह स्पष्ट है कि पुस्तकालय प्रयोक्ताओं की साक्षरता जानकारी बढ़ाने में एक महत्त्वपूर्ण भूमिका निभा रहे हैं। इसके अलावा, उपयोगकर्ताओं के बीच आवश्यक कौशल प्रदान करने की दशा में उन्हें सशक्त बनाने के क्रम में पुस्तकालय के स्टाफ को उपयुक्त खोज रणनीतियों को अपनाने और उन्नत तकनीक को सीखने की जरूरत है। सूचना के इलैक्ट्रॉनिक संसाधनों ई.आई.आर.एस. का उपयोग करने में स्नातकोत्तर छात्र स्नातक छात्रों की तुलना में अधिक निपुण प्रतीत लग रहे हैं। ऐसा इसलिए भी है क्योंकि वे इन साधनों के लिए अपेक्षाकृत अधिक पहुंच रहे हैं और क्योंकि उपयोगकर्ता अभिविन्यास, प्रषिक्षण और प्रचार तंत्र में महाविद्यालयों की तुलना में विश्वविद्यालय अच्छी तरह से स्थापित हैं। यह माना जा रहा है कि अभी भी आबादी के आधे उपयोगकर्ता

जानकारी संसाधनों के मुद्रित रूप को अधिक पसंद करते हैं लेकिन यह प्रवृति इलैक्ट्रॉनिक रूप की दषा में भी तेजी से बदल रही है। ऐसा लगता है कि शैक्षणिक और अनुसंधान प्रयोजनों के लिए ज्यादा जानकारी का उपयोग करते हुए उपयोगकर्ताओं को काम के द्वारा समीक्षा के तहत शामिल किया गया है। पुस्तकालयों ने उपयोगकर्ताओं की संतुष्टि के स्तर को काफी हद तक बढ़ाया जा चुका है। समस्याएं को सुलझाना अभी भी मौजूद है और प्रस्तुत पत्र में समेकित संभव उपचारों को प्रकाश मे लाने के लिए प्राथमिकता के आधार पर संबोधित करने की जरूरत है। समस्याओं को सरकारी और निजी–सार्वजनिक भागीदारी दोनों ही माध्यम से प्राथमिकता के आधार पर सिफारिशी उपचारों के आलोक में संबोधित किया जाना चाहिए।।

REFERENCES

1. Ali, Amjad. Application of information technology in the educational media libraries in Delhi. In Proceedings of the XX IATLIS National Conference on Globalization of Library and Information Science Education, University of Madras, Chennai, 21-23 November, 2004, pp. 89-96. Hyderabad: Indian Association of Teachers of Library & Information Science.

2. Khan, A. M.; & Ahmad, N. Use of e-journals by research scholars at Aligarh Muslim University and Banaras Hindu University. *The Electronic Library*, 2009, **274**, 708–717.

3. Haridasan, S.; & Khan, M. Impact and use of e-resources by social scientists in National Social Science Documentation Centre NASSDOC, India. *The Electronic Library*, 2009, **271**, 117–133.

4. Nwezeh, C. M. T. The impact of internet use on teaching, learning and research activities in Nigerian universities: A case study of Obafemi Awolowo University. *The Electronic Library*, 2010, **285**, 688–701. DOI: 10.1108/02640471011081960.

5. Sujatha, H. R. & Shivananda Murthy, H. End-user training on the utilization of electronic information sources in fisheries sciences institutions in South India. *The Electronic Library*, 2010, **285**, 741–754. DOI: 10.1108/02640471011082013.

6. Long, S. A. Adapt or die: A call to action for libraries. *New Library World*, 2006, **1075**(6), 258–260. DOI: 10.1108/03074800610665257.

7. Anaraki, L. N. & Babalhavaeji, F. Investigating the awareness and ability of medical students in using electronic resources of the integrated digital library portal of Iran: A comparative study. *The Electronic Library*, 2013, **311**, 70–83.

8. Anunobi, C. V. Survey on impediments to students' use of internet facilities. *The Information Technologist*, 2006, **32**, 40–50.

9. Doney, L.; Barlow, H. & West, J. Use of libraries and electronic information resources by primary care staff: Outcomes from a survey. *Health Information and Libraries Journal*, 2005, **223**, 182–188.

10. Kling, R. & Callahan, E. Electronic journals, the internet and scholarly communication. *Annual Review of Information Science and Technology*, 2004, **37**, 127–77.

11. Clarke, J. Global electronic collection trends in academic libraries. Publishers Communication Group, Cambridge, 2004. Retrieved from at http://www.pcgplus.com/Resources/GlobalEITr.pdf.

12. Raza, M.M. & Upadhyay, A.K. Usage of e-journals by researchers in Aligarh Muslim University: A case study. *International Information & Library Review*, 2006, **383**, 170–79.

13. Dong, X. O. Searching information and evaluation of the internet: A Chinese academic user survey. *The International Information and Library Review*, 2003, **352**(4), 163–87.

14. Verma, R. & Baljinder Kaur. Use and impact of electronic resources in Indian Institutes of Technology in India: A case study. In EMPI, *Digital Library National Convention*, 18-20 March 2007, pp 26–33.

15. Maheswarappa, B. S. & Tadasad, P. G. Collection development in the context of electronic publications and networking: problems and prospects. DESIDOC *Bulletin of Information Technology*, 1997, **171**, 25–31.

16. Kumar, Shailendra. & Manish Singh. Access and use of electronic information resources by scientists of National Physical Laboratory in India: A case study. *Singapore Journal of Library & Information Management*, 2011, **40**, 33–49.

17. Gowda, V. & Shivalingaiah, D. Attitude of research scholars towards usage of electronic information resources: a survey of university libraries in Karnataka. *Annals of Library and Information Studies*, 2009, **56**, 184–191.

18. Okello-Obura, C. Assessment of the problems LIS postgraduate students face in accessing e-resources in Makerere University, Uganda. *Collection Building*, 2010, **293**, 98–105.

19. Chirra, R. & Madhusudhan, M. Use of electronic journals by doctoral research scholars of Goa University, India. *Library Hi Tech News*, 2009, **2610**, 12–15.

20. Gupta, D. K. Use pattern of print and electronic journals at the Kurukshetra university, India. Program: electronic library and information systems, 2011, **452**, 213–230. DOI: 10.1108 /00330331111129741.

21. Warraich, N. F. & Kanwal, A. Perceptions of LIS professionals regarding use of Pakistan National Digital Library databases. *The Electronic Library*, 2010, **281**, 108–121. DOI: 10.1108/02640471011023414.

22. Tenopir, C. Use and users of electronic library

resources: An overview and analysis of recent research studies. Council on Library and Information Resource, Washington, DC, 2003. Retrieved from: http://www.clir.org/pubs/reports/pub120/pub120.pdf.

23. Hernando, S. & Trinder, V. South West Information for Clinical Effectiveness SWICE: Evaluation of year one of the pilot project 2001. Retrieved from NHS Executive South West: www.iapt.nhs.uk/silo/files/iapt-3-year-report.pdf.

24. Deng, H. Emerging patterns and trends in utilizing electronic resources in a higher environment. *New Library World*, 2010, **1113**(4), 87–103.

25. Wilson, J. Library User's Survey 2005: Electronic Resources Are Easily Accessed. Retrieved from : www.lib.monash.edu.au.

26. Barllan, J. & Fink, N. Preference for electronic format of science journals: A case study of the Science Library users at the Hebrew University. *Library and Information Science Research*, 2005, **273**, 363–376.

27. Swain, D. K. & Panda, K. C. Use of electronic resources in business school libraries of an Indian state. *The Electronic Library*, 2009, **271**, 74–85.

28. Gardiner, D.; McMenemy, D. & Chowdhury, G. A snapshot of information use patterns of academics in British universities. Online Information Review, 2006, **304**, 341–359.

29. Marriott, R. Yes, but how do we know if it's working? Evidence regarding impact on clinical practice of access for health service staff to bibliographic databases and full text electronic journals. Library Review, 2002, **517**, 358–363.

30. Zabed Ahmed, S. M. A survey of students' use of and satisfaction with university subscribed online resources in two specialized universities in a developing country. *Library Hi Tech News*, 2013, **30**(3), 6–8. Retrieved from http://www.emeraldinsight.com/journals.htm?issn=0741-9058&volume=30&issue=3&articleid=17087509.

31. Gray, C. E-journals: Their use, value and impact, final report, 2011. Retrieved from http://www.rin.ac.uk/our-work/communicating-and-disseminating-research/e-journals-theirusevalue-and-impact.

32. Zha, X.; Li, J. & Yan, Y. Comparison between Chinese and English electronic resources: A survey of users of Chinese university library. *Library Hi Tech*, 2013, **31**(1), 109–122.

33. Mohamed Haneefa, K. Application of information and communication technologies in special libraries in Kerala India. *Library Review*, 2007, **567**, 603–620.

34. Chowdhury, G.G. Access and Usability Issues of Scholarly Electronic Publications. *In* Scholarly publishing in an electronic era, 2004-2005, edited by G. Gorman & F. Rowland, pp. 77–98. Facet Publishing, London, 2004. Retrieved from http://www.cis.strath.ac.uk/cis/research/publications/papers/strath_cis _publication_315.pdf.

35. Crawford, J. C. & Daye, A. A survey of the use of electronic services at Glasgow Caledonia University. *The Electronic library*, 2000, **184**, 255–56.

36. Rogers, S. A. Electronic journal usage at Ohio State University. *College & Research Libraries*, 2001, **62**(1), 25–34.

37. Herring, S. D. Use of electronic resources in scholarly electronic journals: a citation analysis. *College & Research Libraries*, 2002, **634**, 334–340.

38. Romanov, K. & Aarnio, M. A survey of the use of electronic scientific information resources among medical and dental students. *BMC Medical Education*, 2006, **61**, 28.

39. Nagaraja, A.; Gangadhar, K. C. & Vasanthakumar, M. Whether big deals are really big for engineering college libraries?: Or is there any need for better model? *Library Hi Tech*, 2011, **294**, 741–750.

40. Baro, E. E.; Endouware, B. C. & Ubogu, J. O. Awareness and use of online information resources by medical students at Delta State University in Nigeria. *Library Hi Tech News*, 2011, **2810**, 11–17.

41. Dadzie, P. S. Electronic resources: Access and usage at Ashes University College. Campuswide Informatiion System, 2005, 225, 290-297.

42. Majid, S. & Tan, A. T. Usage of information resources by computer engineering students: A case study of Nanyang Technological University, Singapore. *Online Information Review*, 2002, **265**, 318–325.

43. Ndinoshiho, J. M. The use of electronic information services by undergraduate nursing students at the University of Namibia's Northern Campus: A descriptive study. *Information Development*, 2010, **261**, 57–65.

44. Ani, O. E. Internet access and use: A study of undergraduate students in three Nigerian universities. *The Electronic Library*, 2010, **284**, 555–567.

45. Dhingra, N. & Mahajan, P. Use of electronic journals: A case study of Panjab University library. *In* Proceedings of 5th International Convention on Automation of Libraries in Education and Research Institutions CALIBER 2007, 8-10 February, Panjab University, Chandigarh. Retrieved from http://shodhganga .inflibnet.ac.in/dxml/Bitstream/handle/1944/1449/745-755.pdf?sequence¼1.

46. Sathe, N. A.; Grady, J. L. & Giuse, N. Print versus electronic journals: A preliminary investigation into the effect of journal format on research processes.

Journal of Med Library Association, 2002, **902**, 235–243.

47. Adams, J. A.; & Bonk, S. C. Electronic information technologies and resources: Use by university faculty and faculty preference for related library services. *College and Research Libraries*, 1995, **56**, 119–31.

48. Rehman, S.; & Ramzy, V. Awareness and use of electronic information resources at the health sciences centre of Kuwait University. *Library Review*, 2004, **533**, 150–156.

49. Oduwole, A. A. & Akpati, C. B. Accessibility and retrieval of electronic information at the University of Agriculture Library Abeokuta, Nigeria. *Library Review*, 2003, **525**, 228–233.

50. Al-Ansari, H. Application of information and communication technologies in special libraries in Kuwait. *The Electronic Library*, 2011, **294**, 457–469. DOI: 10.1108/02640471111156731.

51. Vicente, A.; Crawford, J. & Clink, S. Use and awareness of electronic information services by academic staff at Glasgow Caledonian University. *Library Review*, 2004, **538**, 401–407.

52. Kiplang'at, J. An analysis of the opportunities for information technology in improving access, transfer and the use of agriculture information in the rural areas of Kenya. *Library Management*, 1999, **202**, 115–128.

53. Al-Ansari, H. Internet use by the faculty members of Kuwait University. *The Electronic Library*, 2006, **246**, 791–803. DOI: 10.1108/02640470610714224.

54. Balog, K. P. & Plašcak, B. Customer satisfaction at the Faculty of Philosophy Library in Osijek, Croatia. *Performance Measurement and Metrics*, 2012, **132**, 74–91.

55. Schmetzke, A. Accessibility introduction: Accessibility of electronic information resources for all. *Library High Tec*, 2007, **254**, 454–56.

56. Kirriemur, J. The relevance of video games and gaming consoles to the higher and further education learning experience. Ceangal, Western Scotland, 2002. Retrieved from http://books.google.co.in

57. Liu, S.; Liao, S. & Guo, J. Surviving in the digital age by utilizing libraries' distinctive advantages. *The Electronic Library*, 2009, **272**, 298–307.

58. Lwehabura, M. J. F. Skills and training needs for use of electronic information resources EIRs among students in four Tanzanian universities. *University of Dar es Salaam Library Journal*, 2008, **101**(2), 32–43.

59. Tella, A.; Tella, A.; Ayeni, C. O. & Omoba, R. O. Predictors of academic performance: Self-efficacy and use of electronic information. *University of Dar es Salaam Library Journal*, 2008, **91**, 69–83.

60. Arora, R. Computer and information technology skills of first year medical and dental students at CMC Ludhiana. *Health Administrator*, 2005, **171**, 54–8.

61. Hewitson, A. Use and awareness of electronic information services by academic staff at Leeds Metropolitan *University. Library & Information Research News*, 2000, **2478**, 17–22.

62. Manda, P. A. Electronic resource usage in academic and research institutions in Tanzania. *Information Development*, 2005, **224**, 269–282.

63. Okpala, A. E. & Iqbeka, J. O. Analysis of users' searches of CD-ROM databases. *The Electronic Library*, 2005, **233**, 362–368.

64. Renwick, S. Knowledge and use of electronic information resources by medical faculty at the University of the West Indies. *Journal of the Medical Library Association*, 2005, **931**, 21–31.

65. Madhusudhan, M. Internet Use by Research Scholars in University of Delhi, India. *Library Hi Tech News*, 2007, **248**, 36–42. DOI: 10.1108/07419050710836036.

66. Sharma, C. A comparative study of internet use in Haryana Agriculture University and Punjab Agriculture University. *SREL Journal of Information Management*, 2008, **453**, 287–294.

67. Ibrahim, A. E. Use and user perception of electronic resources in the United Arab Emirates University UAEU. *Libri*, 2004, **541**, 18–29.

68. Kannappanavar, B. U. & Swamy, H. M. User perception of library and information services in agricultural science universities in South India: An evaluative study. Library Philosophy and Practice e-journal, 2010, 353. Retrieved from DigitalCommons@University of Nebraska-Lincoln: http://digitalcommon.unl.edu.

69. Madhusudhan, M. Use of electronic resources by research scholars of Kurukshetra University. *The Electronic Library*, 2010, **284**, 492–506.

70. Research Information Network RIN & Consortium of University Research Libraries CURL. Researchers' use of academic libraries and their services: A report. pp. 1–74. Research Information Network, London, 2007. Retrieved from www.rin.ac.uk/ system/files/.../Researchers-libraries-services-report.pdf.

71. Tahir, M.; Mahmood, K. & Shafique, F. Use of electronic information resources and facilities by humanities scholars. *The Electronic Library*, 2010, **281**, 122–136.

72. Premchand-Mohammed, S. Bridging the gap between print and electronic resources at a multi-campus university library. *VINE*, 2011, **413**, 315–333.

73. Bhatt, S. & Rana, M. S. E-information usage among engineering academics in India with special reference to Rajasthan State. *Library Hi Tech*, 2011, **293**, 496–511.

अनुसंधान विद्वानों द्वारा मौलाना आजाद लाइब्रेरी, एएमयू अलीगढ़ के ई–संसाधनों का उपयोग
Use of E-resources by Research Scholars of Maulana Azad Library, AMU Aligarh

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सारांश

यह अध्ययन मौलाना आजाद लाइब्रेरी, एएमयू अलीगढ़ के शोधार्थियों द्वारा ई–संसाधनों के उपयोग की पड़ताल और मूल्यांकन करता हैं। इस अध्ययन का मुख्य उद्देश्य अनुसंधान विद्वानों द्वारा ई–संसाधनों के प्रति उसकी जागरूकता, उपयोग की सीमा, उपयोग करने का उद्देश्य, उपयोग के प्रारूप एवं उपयोग के समय होने वाली समस्याओं का पता लगाना हैं। इस अध्ययन ने निर्धारित सभी उद्देश्यों को पूरा करने का प्रयत्न किया है। मूल दस्तावेजों में सम्माहित फोंट और स्वच्छ स्वरूप को बनाए रखने की क्षमता के कारण पी. डी. एफ. सर्वप्रिय प्रारूप है। हालांकि उपयोगकर्ता ई–संसाधनों का अधिकतम उपयोग कर रहे हैं फिर भी उन्होनें कुछ कारणों का खुलासा किया है जो इनके उपयोग को सीमित एवं बाधित करते हैं। लगभग 66 प्रतिशत उपयोगकर्ताओं ने इंटरनेट की धीमी गति को सबसे आम समस्या बताया हैं जोकि ई–संसाधनों के उपयोग को बाधित करती है। अंत में यह आलेख डेटा विश्लेषण से किए गए कुछ रचनात्मक सुझाव प्रदान करता है जो ई–संसाधनों के उपयोग को बढ़ाने और मौलाना आजाद लाइब्रेरी में उपयोगकर्ताओं की आवश्यकताओं को पूरा करने में निश्चित रूप से सहायक होगें। यह आलेख विशेष रूप से अलीगढ़ मुस्लिम विश्वविद्यालय की मौलाना आजाद लाइब्रेरी के अनुसंधान विद्वानों द्वारा ई–संसाधनों का उपयोग करने तक ही सीमित हैं। यह शोधपत्र मौलाना आजाद लाइब्रेरी, एएमयू विश्वविद्यालय में अनुसंधान विद्वानों द्वारा ई– संसाधनों के उपयोग पर प्रकाश डालता है तथा इलैक्ट्रॉनिक संसाधनों और सेवाओं में सुधार के लिए कुछ रचनात्मक सुझाव प्रदान करता हैं।

ABSTRACT

This study explores and evaluates the use of e-resources by the research scholars of Maulana Azad Library, AMU Aligarh. The prime objective of this study is to find out the awareness and extent of use of e-resources by research scholars, purpose of using e-resources, examine the preferred format of using these resources and problems faced while using e-resources. The study tried to meet up all the objectives laid down. PDF is the most preferable format among research scholars because of embedded fonts appearance and layout of document. Although users are making maximum use of e-resources they have disclosed few factors that delimit their use. Around 66% users rated slow downloading of internet the most common problem which hampers the use of e-resources. At the end the paper provides some constructive suggestions derived from the analysis of data which would be definitely of great help to enhance the utilisation of e-resources and fulfill user's requirements in Maulana Azad Library. The paper restricts the study exclusively to use of e-resources by the research scholars of Maulana Azad Library, Aligarh Muslim University. The paper highlights the use of e-resources by research scholars at Maulana Azad Library, AMU University with some constructive suggestions for improvement of electronic resources and services.

Keywords: Use, E-resources, research scholars, AMU, library

1. INTRODUCTION

Information and Communication Technology has revamped the way information is collected, stored, processed and retrieved and made the resources available to the users' desktops with a single click of mouse. Libraries have witnessed a great transformation in their collection, services and users and in the present scenario they have turned into information centers with different policies, procedures and practices. Electronic resources are becoming increasingly popular among all types of libraries and replacing their printed counterparts because of ease of use, authenticity and instant access. Users have a great urge for getting more and more information online and there is a radical change in the rate of usage of e-resources that is why libraries are shifting moreover from print resources towards e-resources. These e-resources are proving of great help and value to researchers and scholars working

in diversified fields of knowledge.

Different types of e-resources are as follows:

- E-Books
- E-Journals
- E-Thesis and Dissertations
- E-Databases
- Institutional Repositories
- Search Engines
- Digital Library Resources
- Internet Resources.

2. SCOPE AND COVERAGE

The scope of this study is limited to research scholars of Maulana Azad Library which is regarded as second largest University Library of Asia with more than 11.5 lakh books/documents. The foundation of the Library was laid in 1875 when Sir Syed Ahmad Khan, a great social reformer of his time, established a school that later became Mohammaden Anglo Oriental College in 1877 and finally Aligarh Muslim University in 1920 by an Act of Parliament. The Oriental Division of Maulana Azad Library comprising of about two lakh printed books & periodicals including 10,000 items belonging to rare category in Urdu/Persian/ Arabic/Hindi & Sanskrit forms the most significant part of the collection. Donations received from great bibliophiles and literary persons are designated as special The Urdu collection with more than one lakh books on almost all aspects of Indian life and culture forms the largest part of Oriental Division. One of the most priced collection of the library is that of 16000 rare manuscripts, one of which written on parchment in Koofi script is claimed to be inscribed by Hazrat Ali (the fourth caliph of Islam), 1400 years ago. Apart from the collection of orientalia the library has a vast collection of books in English belonging to different subjects especially in science & technology. Campus wide access to online journals through a well-equipped computer lab is furnished by the library to the entire university. Digital Resources on diverse subjects are made accessible through a Digital Resource Centre since March 2009[1].

2.1 E-Resources Available through UGC-INFONET Digital Library Consortium

Maulana Azad Library subscribes to the following resources through UGC-INFONET Digital Library Consortium[2]. List of full-text E-resources available for researchers is given in Fig. 1.

3. REVIEW OF LITERATURE

A number of studies had already been done on the use of e-resources in the universities and institutes worldwide. Some of them from India and abroad have been penned down:

Survey conducted on electronic information resources at the University of Agricultural Sciences Raichur, Karnataka, India shows that users were using internet and other e-resources from university and internet café more for accessing the information. The printed material is being replacing by the electronic resources[3]. Use of electronic resources among academic scholars of The Islamia University of Bahawalpur (IUB), Punjab, Pakistan showed that most of the researchers (61%) used electronic resources daily for Learning, education, and research purposes. Most of them (57%) were 'satisfied' with the usage of electronic resources. Easy use and easy access to documents were the major reasons of using these resources. Lack of internet connection is the major problem faced by the respondents[4].

Usage of electronic resources by undergraduates at the Redeemer's University library, Mowe, Nigeria showed a tremendous impact of electronic resources on the academic performances of the undergraduate students of Redeemer's University; however, there is need for them to acquire more skills in the use of electronic resources[5]. Status of electronic resources provided by the Dhaka University Library (DUL) disclosed that a majority of the users use e-resources for their learning purpose. Although DUL lacks of infrastructure facilities, the existing e-resources can fulfil user needs[6]. Use of e-resources by post graduate students of IFMR business school, Chennai revealed that 100% users are aware of the e-resources. Users assigned first place for internet with regard to usefulness of e-resources. Online databases were also seemed to be favourite useful resources[7].

Use of library electronic collections at National Taiwan University (NTU) indicated that most students agreed that library electronic resources were important to their studies, but they did not use the resources frequently. Not all students possessed equivalent computer competence to use library electronic resources. This study also found that students were not confident about their capabilities in using library electronic resources. Low correlation was found between students' levels of computer competences and their frequency, familiarity, and perceived importance of electronic resources[8]. Awareness and use of electronic resources by university undergraduates in Niger State found that the Internet services, e-mail services, online database and electronic database were the available electronic resources often used by the undergraduate students in both universities. The level of use of electronic resources by undergraduate students in universities is not too encouraging coupled with the inadequate power supply, inadequate provision of key electronic resources and facilities in the library affecting the effective use of electronic resources[9].

Table 1. Full - text e - resources

Resource Name	Resource URL	No. of Journals
American Chemical Society	http://www.pubs.acs.org	37
American Inst. of Physics	http://journals.aip.org	18
American Physical Society	http://publish.aps.org/browse.php	10
Annual Reviews	http://arjournals.annualreviews.org	33
Cambridge University Press	http://journals.cambridge.org	224
Economic & Political Weekly	http://www.epw.in	1
Emerald	http://www.emeraldinsight.com	29
Institute of Physics	http://www.iop.org/EJ	46
ISID	http://isid.org.in	Database
JCCC	http://jccc-ugcinfonet.in or www.jccc-ugcinfonet.in	Database
J-STOR	http://www.jstor.org	1401+
MathSciNet	http://www.ams.org/mathscinet	1 Database
Nature	http://www.nature.com/nature	1
Oxford University Press	http://www.oxfordjournals.org	206
Portland Press	http://www.portlandpress.com/pp/journals/default.htm	8
Project Euclid	http://projecteuclid.org	30
Project Muse	http://muse.jhu.edu	411+
Royal Society of Chemistry	http://www.rsc.org/Publishing/Journals	29+6 Database
Elsevier Science	http://www.sciencedirect.com	1036
SciFinder Scholar	http://scifinder.cas.org	1 Database
SIAM	http://epubs.siam.org	14
Springer Link	http://www.springerlink.com	1389
Taylor and Francis	http://www.informaworld.com	1365
Web of Science	http://apps.isiknowledge.com	1 Database
Wiley-Blackwell Publishing	http://www3.interscience.wiley.com	908

4. OBJECTIVES OF THE STUDY

1. To find out the awareness and extent of use of e-resources by research scholars.
2. To ascertain various types of e-resources used by research scholars and to know how frequently they are using them.
3. To explore the purpose of using e-resources and to examine the preferred format of using these resources.
4. To find out the factors that hinders the usage of e-resources.
5. To provide suggestive measures based on the inferences drawn from the study.

5. METHODOLOGY

The study was confined to the research scholars, Maulana Azad Library, Aligarh Muslim University, Aligarh India. A survey with a structured questionnaire as a tool was conducted to collect the information regarding the use of e-resources, frequency of use of e-resources, purpose of using e-resources, problems faced by the users while using e-resources. Stratified accidental random sample method was used for selection of respondents and interacting with them. In total 60 questionnaires were randomly circulated among research scholars during the survey period 15-30 May 2014 to collect the primary data, out of which 50 questionnaires were found worth usable for analysis. The questionnaires were completed by personal visits with users by the colleague of the authors. The collected data was presented in the tabular form and analyzed by using a simple method of calculation.

6. ANALYSIS

6.1 Awareness about E-Resources

Respondents were asked to indicate their awareness about e-resources. Table-1 highlights the awareness of e-resources among research scholars. All fifty research scholars stated that they are well aware of e-resources. It means university had already taken many initiatives to imbibe e-resources awareness and their value among users for take up their research.

6.2 Frequency of E-Resources Use

Response sought regarding how frequently research scholars use e-resources is presented in Table 2. Majority

Table 1. Awareness about E-resources

Awareness about digital information sources	No. of Respondents (N=50)	Total (%)
Yes	50	100%
No	-	-

of research scholars i.e. 60% use e-resources on daily basis, 24% use them weekly, 10% use fortnightly whereas 6% of them use e-resources monthly. None of the users responded about occasional use of e-resources.

6.3 Types of E-Resources Used

E-resources have been categorized into various types such as e-journals, e-books, websites, portals, online courses, listservs, special internet groups , chat, mailing list, multimedia collection, online book shop, sound, etc. Table 3 shows that the majority of the

Table 2. Frequency of E-resources use

Frequency	No. of Respondents (N=50)	Total (%)
Daily	30	60%
Weekly	12	24%
Fortnightly	5	10%
Monthly	3	6%
Occasionally	-	

research scholars 40 (88%) prefer to use e-journals. Second highest preference is E-Database with 25 (50%) research scholars. 40% of research scholars make the use of e-newspapers. 34% users like e-books, 30% make use of e-reports, 28% users cons ult e-thesis/dissertations, whereas only 26% of them use e-magazines. Table 3 highlights that only the e-journals and e-databases e-resources are preferably used by the researchers, rest of the e-resources i.e. e-newspapers, e-books, e-reports, e-thesis and e-magazines are comparatively less used.

6.4 Purpose of E-Resources use

E-resources are used for variety of reasons. Five reasons were listed against which respondents were allowed to choose more than one reason for using

Table 3. Types of E-resources used

E-Resources	No. of respondents N=50)	Total (%)
E-Books	17	34%
E-Magazine	13	26%
E-Journals	40	80%
E-Database	25	50%
E-Newspaper	20	40%
E-Thesis/dissertations	14	28%
E-Reports	15	30%

Multiple responses were permitted

e-resources. As indicated 86% users used e-resources to expedite their research work , 56% used e-resources to consult journals, 40% used for finding out specific information in the area of interest, whereas 38% users utilized web resources and 36% used for e-mail and document exchange. (Fig 1.)

The analysis established the fact that e-resources are basically used by the research scholars to carry out their real time research work.

6.5 Preferred file formats for using
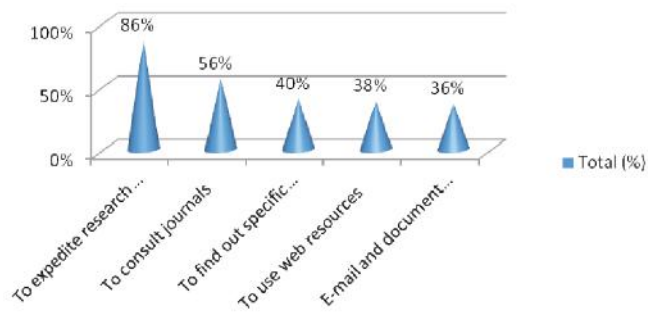
Figure 1. Purpose of using e-resource.

E-Resources

Table 4 evinces researchers' preference for various formats that affects e-resource use. The majority of users (78 per cent) preferred accessing articles in PDF whereas; a few (8 per cent) preferred HTML for reading journal articles. Only 14% users preferred both pdf and html formats.

PDF is the most preferable format among research scholars because of embedded fonts appearance and layout of document is retained.

6.6 Problems in accessing E-Resources

Although e-resources have proved of much importance to research community and become an integral part of their research, there are variant factors that limit their use. Here; an attempt is made to find these obstacles. Users' views relating to such problems are presented in Table 5 for analysis.

It is revealed from the views of majority of

Table 4. Preferred file formats for using E-resources

Format	No. of respondents (N=50)	Total (%)
PDF	39	78%
HTML	4	8%
Both	7	14%

respondents i.e. 66% found slow downloading of internet the most common problem which hampers the use of e-resources. The next problem faced is of infrastructure. Sometimes users have to wait for hours to get the internet terminal for getting access to

e-resources. Table further reveals that 34% users are facing problem due to much information retrieved and finding it difficult to trace out the exact information needed. About 30% users admitted that they have to wait for long time to view a particular article, whereas 26% users facing difficulty in finding relevant information.

7. FINDINGS

- All fifty research scholars are well aware of e-resources.
- Majority of research scholars i.e. 60% use e-resources on daily basis.
- 88% research scholars prefer to use e-journals. Second highest preference is E-Database covering

Table 5. Problems in accessing E-Resources

Problems	No. of Respondents (N=50)	Total (%)
Slow Speed/Downloading	33	66%
Infrastructure are not available	20	40%
Too much information retrieved	17	34%
Long time to view	15	30%
Difficulty in finding relevant information	13	26%

Multiple responses were permitted
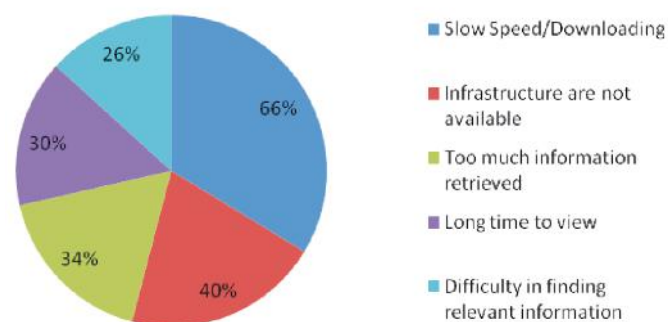
Figure 1. Problems in accessing E-resources.

50% of the response.

- PDF is the most desirable format among research scholars with 78% research scholars preferred accessing articles in PDF format.
- 86% users used e-resources to expedite their research work
- 66% research scholars found slow downloading of internet the most common problem which hampers the use of e-resources.

8. CONCLUSION AND SUGGESTIONS

Use of e-resources by research scholars of Maulana Azad Library, AMU shows that research scholars (100%) are completely aware of e-resources provided by the library. The 100% awareness of e-resources among research scholars reflects the various initiatives already taken by the library to teach its users about the availability and usefulness of e-resources. Majority of research scholars use e-journals on daily basis because of timely literature searching, quick and instant access with ease of use to a large number of databases. Research scholars preferred to read articles in PDF format scholars because of embedded fonts appearance and layout of document is retained. Library staff should check the latest version of pdf and installed it on every terminal to make downloading quicker and easier. Library should expand and developed more e-resources subject-wise. Although e-resources are admired by research community and impact of these resources is increasing with each passing day for enhancing scholarly communication and other alternative reasons still slow downloading of internet makes their search irksome while looking for important piece of information/article. Bandwidth and connectivity of internet should be increased up to the required level so that the problem of slow downloading may be resolved and e-resources may be accepted and utilized to the maximum level without any hindrance. Moreover, the authorities should take necessary action to set up more internet labs with high speed bandwidth and connectivity.

निष्कर्ष एवं सुझाव

मौलाना आजाद लाइब्रेरी एएमयू के अनुसंधान विद्वानों द्वारा ई–संसाधनों का उपयोग दर्शाता है कि सभी शोधार्थी पुस्तकालय द्वारा प्रदान किए गए ई–संसाधनों से पूरी तरह से अवगत हैं। अनुसंधान विद्वानों में ई–संसाधनों की 100 प्रतिशत जागरूकता पुस्तकालय द्वारा ई–संसाधनों की उपलब्धता और उपयोगिता के बारे में उपभोक्ताओं को पढ़ाने के लिए उठाए गए विभिन्न पहलुओं को दर्शाता है। अधिकतर शोधार्थी दैनिक आधार पर ई–पत्रिकाओं का उपयोग कर रहे हैं क्योकि इनको तेजी एवं आसानी के साथ विभिन्न डेटाबेस से समय पर साहित्य की आसानी से खोज एवं तुरन्त प्राप्ति हो रही है। मूल दस्तावेजों में सम्माहित फोंट और स्वच्छ स्वरूप को बनाए रखने के कारण शोधार्थी पी. डी. एफ. प्रारूप में आलेख पढने को महत्व दे रहे हैं। पुस्तकालय कर्मचारियों द्वारा डाउनलोडिंग को तेज और आसान बनाने के लिए प्रत्येक कम्प्यूटर पर नवीनतम पी. डी. एफ. संस्करण को अधिष्ठापित (इंस्टॉल) करने के पश्चात् जांचना आवश्यक है।

पुस्तकालय को विषयानुसार अधिक ई–संसाधनों का विकास और विस्तार करना चाहिए। हालांकि ई–संसाधनों की अनुसंधान समुदाय द्वारा प्रशंसा की जा रही हैं और अनुसंधान सूचना को बढाने के लिए इन संसाधनों का प्रभाव हर गुजरते दिन के साथ बढ़ रहा हैं संचार और दूसरे कारणों से इंटरनेट की धीमी गति के कारण

किसी भी लेख के महत्वपूर्ण हिस्से को देखने में उपभोक्ताओं को कठिनाई का सामना करना पड़ रहा है। बैंडविड्थ और इंटरनेट की कनेक्टिविटी को अपेक्षित स्तर तक बढ़ाया जाना चाहिए ताकि धीमी गति से डाउनलोड की समस्या को हल किया जा सके और ई–संसाधनों को बिना किसी रुकावट के स्वीकारा और अधिकतम स्तर तक उपयोग किया जा सके। इसके अलावा प्राधिकारियों को अधिक इंटरनेट प्रयोगशालाओं की स्थापना एवं उच्च गति की बैडविड्थ एवं कनेक्टिविटी प्रदान करने हेतु आवश्यक कार्रवाई करनी चाहिए।

REFERENCES

1. Aligarh Muslim University: A brief introduction. http://www.medbeats.com/amu/introductionofamu.htm. Last accessed on 15 May 2014.

2. Maulana Azad Library: Aligarh Muslim University. http://www.malibrary.com/ Last accessed on 15 May 2014.

3. Prakash. B.W., Shamrao, R. & Satishkumar S.Use of internet and electronic resources in university of agricultural sciences, raichur (karnataka, india). *Indian Streams Res. J.,* 2014. http://www.isrj.net/Article.aspx?ArticleID=4063. Last accessed on 15 May 2014.

4. Anam Amjad, Shamshad Ahmed & Salman Bin Naeem. Use of electronic information resources among research scholars in the Islamia University of Bahawalpur, Pakistan, *New Rev. Academic Librarianship*., 2013, **19**(3).

5. Adeniran, Pauline. Usage of electronic resources by undergraduates at the Redeemer's University, Nigeria. *Int. J. Lib. Info. Sci*., 2013, **25**(10), 319-324.

6. Habiba & Chaudhary. Use of electronic resources and its impact: A study of Dhaka University Library users. *Eastern Librarian*, 2013, **23**(1), 74-90. http://www.banglajol.info/index.php/EL. Last accessed on 5 May 2014.

7. Pandurangaswamy & Kishore, Avini. Use of electronic resources by postgraduate students of the institute for financial management and research (IFMR), Chennai, India. *E-Lib. Sci. Res. J.*, 2013, **1**(12). http://lsrj.in/UploadedArticles/133.pdf. Last accessed on 15 May 2014.

8. Wu, Ming-Der & Yeh, Ssu Tsen. Effects of Undergraduate Student Computer Competence on Usage of Library Electronic Collections, *J. Lib. Infor. Studies*., 2012, **10**(1), 1-17.

9. Macauley, S.O. Awareness and use of electronic resources by undergraduate university students in niger state. School of science and science education, Federal University of Technology, Minna, September 2012. PhD Thesis, 340p. http://dspace.futminna.edu.ng/jspui/handle/1/340. Last accessed on 20 May 2014.

आईपीएस अकादमी पुस्तकालयों के उपयोगकर्ताओं में ई–संसाधनों का उपयोग और जागरूकता : एक अध्ययन

Use and Awareness of E-resources Among the Users of IPS Academy Libraries: A Study

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सारांश

वर्तमान आलेख आई पी एस एकेडमी के पुस्तकालयों में इलैक्ट्रॉनिक संसाधनों के उपयोग और जागरूकता को दर्शाता हैं और मौजूदा इलैक्ट्रानिक संसाधनों, भविष्य की योजनाओं और पाठकों द्वारा ई–संसाधनों के उपयोग की आवृत्ति का आकलन करता है। वर्तमान आलेख आईपीएस एकेडमी के पुस्तकालयों में विभिन्न ई–डेटाबेस के अस्तित्व को भी परखता है। अब शैक्षणिक संस्थानों के पुस्तकालय परिसर से बाहर के शिक्षकों और छात्रों को उनकी जगह पर सूचना प्रदान कर रहा हैं। क्योंकि सूचना उत्पादों के जीवन चक्र शुरूआत से अंत तक तेजी से डिजिटल हो रहा है इसलिए इलैक्ट्रॉनिक सूचना प्रबंधन की प्रकृति नाटकीय रूप से बदल रही हैं। ये परिवर्तन नई रणनीतियों और तरीकों के साथ ही नए मुद्दों और चुनौतियों लाया है। इलैक्ट्रॉनिक संसाधन किसी भी शैक्षणिक संस्थान के पुस्तकालयों में संग्रह के निर्माण सम्बन्धी गतिविधियों में तेजी से बढता हुआ महत्वपूर्ण घटक हैं।

ABSTRACT

The present paper mainly highlights the use and awareness of electronic resources in the IPS Academy's Library, describes its existing electronic resources, future plans and assesses the frequency of use of e-resources by the readers. The present paper also examines the existence of various e-Databases in IPS Academy's libraries. Libraries in academic institutions can now provide information access to off-campus faculty and students wherever they are located. As the life cycle of information products has become increasingly digital from 'cradle to grave', the nature of electronic information management has dramatically changed. These changes have brought new strategies and methods as well as new issues and challenges. Electronic resources represent an increasingly important component of the collection building activities in libraries of any academic institution.

Keywords: E-resources, IPS academy (Indore), e-books, internet

1. INTRODUCTION

The library and information centers are heavy consumers of electronic journals and online databases and stand to benefit its users greatly from this technology-driven revolution. This obviously occurs now that the world is turning into a global village. In education, ICT has made tremendous impact to enhance learning. These technologies have been applied in so many ways in the learning pursuits. Learning materials now a day are coming in electronic formats which can be read via electronic means for learners. This means of learning becomes e-learning. E-learning (electronic learning) involves use of electronic media (the Internet, DVD, CD-ROM, Videotape, television, cell phones, etc.) for teaching and learning at a distance.

In the present scenario all the libraries and information centers have radically changed the information environment. Electronic resource is a very broad term that includes a variety of different publishing models like OPAC, CD-ROM, e-database, e-journals, e-books, e-thesis, e-mail publishing and e-content page etc. Now a huge number of electronic resources in every subject area are publishing every day and being more popular among users.

2. REVIEW OF THE LITERATURE

- Omotayo (2010), Thanuskodi (2010), Sharma (2009), Borrego (2007), and Ibrahim (2004) have all reported that e-journals are the most used among the arrays of available electronic resources.
- Thanuskodi (2010) identified and tested ten e-resources in his study: Highwire Press, MedBio World, Ingeta, All Health Net, Blackwell Synergy, Medind, Science Direct, LWW Online, Springer

Link, and Health Inter Network India and found that the respondents preferred the Highwire Press CD-ROM database with a mean score of 4.15 on a 5 point rating scale.

- Salaam and Adegbore (2010) discovered that search engines are an essential electronic resource for students of private universities in Ogun State, with 51 (45.95 %) of the total population of 111 using them very frequently.
- Sharma, S.K. (2009) identifies e-resources to include journals, data archives, manuscripts, maps, books, magazines, theses, newspapers, e-mail, research reports, and bibliographic databases.
- Yernagula, Ramesh & Kelkar, P.K. (2008) describes that the phenomenon of consortia or group of libraries buying e-information together has become very important in the last few years, particularly the World Wide Web (WWW), as a new medium of information storage and delivery in the 21st century.
- Sarasvady, S. and Khatri, N. (2005) in their paper A study of the Use of Electronic Resources for Implementing: Library Consortium says that when library consortiums are formed, the existing environment about users' preferences and difficulties needs to be studied. Initiating such studies would enable to incorporate the findings as the major input in consortium formation.

3. SCOPE AND OBJECTIVES

The study is conducted in a limited area. We have undergone the study in various Departments of IPS Academy, Indore. Although the study is focused on students but the findings of the study will be helpful for all the students, research scholars and faculty members of the academy because it will create awareness regarding e-resources among them and other benefits they can take by the use of e-resources.

The following are the objectives for the present study:
- To study and create the awareness among students about e-resource available in the Academy.
- To analyze the helpfulness of e-resource for students.
- To determine the facilities provided by colleges/ institutes for accessing e-resources.
- To find out the level of satisfaction with e-resources subscribed by the institute.
- To know the problems faced by the students and research scholars while using e-resources.
- To study the preference of students towards different E-resources available in Academy.

3.1 Methodology

Primary data is collected from students of IPS Academy. A small Questionnaire was distributed among the respondents in their classrooms during the vacant periods. Every question was explained to the students for their better understanding and the students were asked to fill up their questionnaire on the spot. Total 375 questionnaires were distributed and 350 were received back.

3.2 Operational Definition of Concept

Operational definitions of this study include electronic resources which mainly covers four aspects:

(i) E-books: E-book is defined as "text in digital form or digital reading materials or book in a computer file format or electronic file of words and images to be displayed on a computer screen or read on a computer through a network or view on a desktop/notebook/ dedicated portable device or read on all types of computers or formatted for display on e-book readers".

(ii) E-journals: According to CONSER (The Cooperative Online Serials Cataloguing Program) a remote access electronic serial (e-journal) is a continuing resource that is accessed via computer networks. E-journals are variously termed as online journals, e-serials, e-zines or webzines or digital serials or d-serials. (http://www.loc.gov/acq/conser/).

(iii) E-thesis and Dissertations (ETD): Now a day, dissertation is presented in an electric medium, which is called an e-dissertation. An ETD is electronic document that explains the intellectual works or research of a researcher. It is expressed in a form simultaneously suitable for machine archives and worldwide retrieval as well as its similar paper processor.

(iv) E-newspapers: An online newspaper, also known as a web newspaper, is a newspaper that exists on the World Wide Web or Internet, either separately or as an online version of a printed periodical. Going online created more opportunities for newspapers, such as competing with broadcast journalism in presenting breaking news in a timelier manner.

3.3 Limitations of E-resources

1. Although e-journals save storage space, a certain amount of space must be allotted for the equipment to read them.
2. Users dislike using e-journals because they are unbreakable and they cannot highlight or make notes in the margins. Prints can be of poor quality if the equipment is not maintained properly.
3. E-journals require some type of machine or device to enlarge them to readable size.
4. A user must view them in the library properly rather elsewhere, because that is the location where viewing machinery is usually kept.
5. The resulting off on screen display or e-documents tends to be significantly lower than that of a

printed pages or conventional documents. These are problematic particularly dealing with content which contains color.

6. Another drawback is the lack of a standard way of displaying materials found in scientific documents.
7. The library catalogue could not be updated with records for electronic resources until cataloguers had viewed it themselves, because the venders' or publishers' listing did not provide sufficient bibliographic data.
8. Library faces problems regarding copyright, faire use, IPR and digital right in dealing with e-journals.

3.4 IPS Academy, Indore

The IPS Academy, Indore is one of the most well-known educational institutes of Indore established in the year 1994. The full form of IPS Academy is Indore Professional Studies Academy. IPS Academy is spread in 58 Acres Lush Green Campus, it is also known for the biggest placement hub of Central India. It is approved by AICTE, COA, PCI, BCI, NCTE, Government of M.P. affiliated to 4 Universities 71 Courses, 8500 Students and 100000 Alumni's.

Indore Professional Studies Academy (IPSA) is one of the Central India's largest educational hub-premises, playing a major role to develop Indore as Central India's most preferred educational centre.

3.4.1 E-resources Available in IPS Academy
• IEEE
• Springer
• ASCE
• McGraw Hill
• J GATE (Engg. & Mgt.)
• ASTM
• EBSCO (Mgt+ Architecture+ Hotel Mgt.)
• BENTHAM
• ELSEVIER
• N-List (3800+e-journals and 80,000+e-books)
• DELNET

4. DATA ANALYSIS AND INTERPRETATION
4.1 Use of Internet

The internet links are computer networks all over the world so that users can share resources and communicate with each other. The internet has become the vital part of student's life, so a question has been asked to know the use of internet by the students.

Table 1. Use of internet

S. No.	Options	Response	Percentage
1.	yes	350	100%
2.	No	00	0%
	Total	350	100%

Table 1 shows that (100 %) students are using internet and the data shows a positive trend towards the awareness of students about using Internet.

4.2 Frequency of Using Internet

Internet is becoming an indispensable part of the student's life; there are various available features which attract student to use it frequently. This question is being asked to know the view of students regarding the frequency of using Internet.

Table 2. Frequency of using internet

S. No.	Options	Response	Percentage
1.	Daily	192	54%
2.	Weekly	94	28%
3.	Bi-Monthly	38	11%
4.	Monthly	26	7%
	Total	350	100%

Table 2 shows that Majority of students (54%) are accessing Internet daily for there various needs, whereas 28 percent of students are using weekly followed by Bimonthly users (11%). Monthly users of Internet are very few (7%).

4.3 Preferred Technique of Search on Internet

There are various techniques for using internet as Keyword search, Subject search, Boolean search, Title search and Advance search are being adopted by the students. So with the help of this question it is tried to know the preference of students towards the searching technique.

Table 3. Preferred technique

S. No.	Options	Response	Percentage
1	Advance Search	78	22%
2	Boolean Search	34	10%
3	key word	52	15%
4	Title Search	154	44%
5	Any other	32	9%
	Total	350	100%

Table 3 shows that most of the students (44%) are using Title search followed by 22% of students with advance search as preferred search technique, and 15% with keyword search and 10% prefer Boolean search. Rest of 9% users is going with any other techniques.

4.4 Preferred Type of Information

Electronic resources provide new dimension for the study. There are various types of literature available for users for accessing. By this question; we will be able to find the preferred type of Information by the students.

Table 4. Preferred type of information

S. No.	Options	Response	Percentage
1.	Current	84	24%
2.	Retrospective	44	13%
3.	Audio visual	20	5%
4.	course oriented	182	52%
5.	Any other	20	6%
	Total	350	100%

Table 4 shows that 52% of the students are searching course oriented Information on the web which is highly appreciable. Current information is priority of searching for 24% of the users, 13% of the users are searching retrospective information followed by 5% of users with audio visual material.

4.5 Satisfaction with Internet Facilities Available in the IPS Academy

The Institute facilitates the students with high speed internet services accessible through labs and library. With the help of this question it is tried to find out the satisfaction level of students with available internet facilities in the Institute.

Table 5. Satisfaction with internet facilities

S. No.	Options	Response	Percentage
1.	Fully satisfied	200	57%
2.	Partially satisfied	78	23%
3.	Least satisfied	36	10%
4.	Unsatisfied	36	10%
	Total	350	100%

Table 5 depicts that majority of students (57%) are fully satisfied with the internet services available in the Institute followed by 23% of users are partially satisfied. Whereas equal percentage of students (10%) are least satisfied and unsatisfied respectively.

4.6 Preferred File Format of Articles Accessed

E-resources content is being uploaded on the website in different formats. This question helps to observe the preference toward file format accessed by the student in IPS Academy.

Table 6. Preferred File Format

S. No.	Options	Response	Percentage
1.	PDF	158	45%
2.	Doc	52	15%
3.	PPT	102	29%
4.	Any other	38	11%
	Total	350	100%

Table 6 shows that majority of the students (45%) prefer PDF format for searching the required article

followed by 29% students prefer PPT format whereas DOC format is opted by 15% of respondents, 11% of students follows any other file format other than these.

4.7 Use of E-resources

Electronic resources have great potential to attract user, e-resource are becoming indispensable part of research and as per the requirement of latest information in reading. This question is being asked to know the use of e-resources by the students.

Table 7. Use of e-resources

S. No.	Options	Response	Percentage
1	Yes	320	91%
2	No	30	9%
	Total	350	100%

Table 7 shows that (91%) students are aware and using e-resources where as rest 9 % of the students are not aware or not using e-resources. The data shows a positive trend towards the awareness of students about using e-resource.

4.8 Frequency of Using of E-resource

This question helps to know the frequency of use of e-resources by the students in IPS Academy.

Table 8. Frequency of using of e-resources

S. No.	Options	Response	Percentage
1	Daily	202	58%
2	Some time	42	12%
3	Usually	28	8%
4	Weekly	78	22%
	Total	350	100%

Table 8 represents that most of the students (58%) are using e-resources daily, while 22% of the users are accessing it weekly and very few users 12% and 8% are using e-resources sometimes or usually. This data shows that students are using e-resource facility regularly.

4.9 Location of Accessing E-resource

With the help of Intranet the e-resources can be accessed from anywhere within the IPS campus. This question helps to discover the favorite place for accessing e-resources by the students.

Table 9. Location of accessing e-resource

S. No.	Options	Response	Percentage
1.	IT Center	110	32%
2.	Cyber Cafe	70	20%
3.	Library	148	42%
4.	Any other	22	6%
	Total	350	100%

The collected data (Table 9) shows that the majority of students (42%) are visiting library for accessing e-resources, while 32% students accessing e-resources from IT Center located in IPS campus, whereas some (20%) of students are approaching cyber café also. Minimum percentage of students (6%) is going with any other location for accessing e-resource. This data shows a positive approach of users towards library.

4.10 Preferred E-resource

There are number of courses like management, engineering, pharmacy, architecture etc. are run by the Academy. The Library of the Institute is subscribing different e-resources to fulfill the information needs of the user community. This question is being asked to know the preference of the users towards all the available options.

Table 10. Preferred e-resource

S. No.	Options	Response	Percentage
1	EBSCO –MBA	204	58%
2.	EBSCO- Architecture	112	32%
3.	Science-Direct Pharmacy	34	10%
4	DELNET	0	0%
	Total	350	100%

The collected data (Table 10) shows that the majority of students (58%) are using EBSCO-MBA for accessing the e-resources, while 32% students accessing from EBSCO-Architecture, whereas 10% students accessing the electronic-resources of pharmacy from Science-direct.

4.11 Purpose of Using E-resource

E-Resource are the most common & favorite format for researchers to update & enhance their knowledge in the field. With all the possible answer it is tried to know the major purpose for which e-resources are being used by students of the Institute.

Table 11. Purpose of using e-resource

S. No.	Options	Response	Percentage
1.	Research Work	42	12%
2.	Subject Study	228	65%
3.	Updating knowledge	52	15%
4.	Publishing Article	28	8%
	Total	350	100%

The data in Table 11 reveals that most of the students (65%) are using e-resource for study about their respective subject, followed by 15% students for updating their knowledge whereas 12% students are using them for research work. The minimum percentage of students (8%) using for publishing articles. This provides an encouraging vision of students towards there study issues.

4.12 Time Spent for Searching E-resource

Since e-resources are quite popular among the students, an effort has been made to find out the popularity of its use by measuring the time spent by students for the same. The replies received are presented in the Table 12.

Table 12. Time spent for searching e-resource

S. No.	Option	Response	Percentage
1	Less than 2 hrs	244	70%
2	2-4 hrs	70	20%
3	More than 4 hrs	36	10%
	Total	350	100%

The time spent on electronic search will directly speak about the time spent on e-resources. As the study reveals that majority of students (70%) spent less than 2 hrs for searching their information, while 20% of the students are spending 2-4 hrs and very few no. of students (10%) are spending more than 4 hrs for searching e-resources over the internet.

4.13 Preferences Towards Literary Forms

Form of electronic material plays an important role in searching e-resources. There are various literary forms available in electronic form. By this question, we tried to find out the preferred form of e-journals for reading by the students.

Table 13. Preferences towards literary forms

S. No.	Options	Response	Percentage
1.	E-Books	70	20%
2.	E-Journals (Current)	116	33%
3.	E-Magazine and newspaper	110	32%
4.	E-Thesis and Dissertations	14	4%
5.	Audiovisual Materials	18	5%
6.	CD-ROM Database	0	0
7.	On-Line Database	22	6%
	Total	350	100%

Table 13 represents that the majority of students prefer e-journal and e-magazine/newspaper for gathering information by 33% and 32% respectively followed by 20% of the students prefer books in electronic format whereas 6% of the students prefer online database. Very few students are interested in audiovisuals and e-thesis.

4.14 Preferred Search Approach

There are various approach terms for searching articles in e-resources. By these questions a researcher will be able to find the most preferable approach of users for searching their required information.

Table 14 shows that most of the students (42%) are adopting Title Searching as the title is the most imperative approach of the document, however 32%

students prefered keyword searching related to the subject of serach. Author or editor search is taken up by 20% of the students and rest 6% students chose Publisher as approach term.

Table 14. Preferred search approach

S. No.	Options	Response	Percentage
1.	Author/Editor	70	20%
2.	Title	148	42%
3.	Keyword/ Subject	112	32%
4.	Publisher	20	6%
	Total	350	100%

4.15 Opinion Towards Advantages of E-resource

Electronic material are very much useful for academic development of the users. Its features like multimedia, easy to access quality and sharing make it very favorite to users. The purpose of this question is to observe the views of respondents towards the advantages they feel regarding the available e-resources in the academy.

Table 15. Opinion towards advantages of e-resource

S. No.	Options	Response	Percentage
1.	Excellent	58	17%
2.	Good	228	65%
3.	Limited	20	6%
4.	Average	44	12%
	Total	350	100%

Table 15 depicts that 65% of the students find it benefitial for there study purpose, followed by 17% of the students believe that these resources are exellent, while very few percentage (12%) found it average. There may be some kinds of problems with particular students while accessing the e-resources, but the analysis revelas that maximum users are found the e-resorse facility good, which shows a positive approach of the users.

4.16 Infrastructural Problems Faced by Users in IPS Academy in Using E-resources

There may be various problems faced by users while accessing e-resources, sometimes these are Infrastructural problems like connectivity, systems, networking, etc. This question helps us to know the kind of Infrastructural problems faced by students in IPS Academy, Indore.

Table 16 shows that majority of students (68%) feel that the Internet connectivity is low which creates a problem while accessing e-resources. However 15% of users shows problem of networking followed by 9% of respondents with compatibility issues of the system. Very few students (8%) opined that there is Insufficient workstation in the institute.

Table 16. Infrastructural problems faced by users in IPS academy in using e-resources

S. No.	Options	Response	Percentage
1.	Low Internet Connectivity	228	68%
2.	Problem in Networking	52	15%
3.	Compatibility of System	32	9%
4.	Insufficient Workstation	28	8%
	Total	350	100%

4.17 Problems in Accessing E-resources

Serching out the exact information from the e-resource is big issue that every one may not be familiar with the techniques or location of the information resource available. This question helps us to know about the problems faced by students on using e-resources.

Table 17. Problems in accessing e-resources

S. No.	Options	Response	Percentage
1.	Time consuming	168	48%
2.	Difficult to use	42	12%
3.	Less information	64	18%
4.	Less useful	76	22%
	Total	350	100%

Maximum number of students (48%) belive that e-resources are time consuming, there may be some other kind of problems like networking etc. which made the process time consuming, 22% of the students found it less usefull, whereas 18% of students supposed that there is not as much of information available in e-form. Minimum number of students (12%) belive that these are difficult to use.

4.18 Satisfaction with E-resources

The Institute is offering large number of facilities for accessing e-resources like infrastructure, laboratories and library facilties to students. The libarry is subscribing number of e-contents for fullfilling the information needs of the clientele. With the help of this question we tried to know the satisfaction level of students regarding the e-resource facility.

Table 18. Satisfaction with e-resources

S. No.	Option	Response	Percentage
1	Not satisfied	28	8%
2	Partially satisfied	54	15%
3	Satisfied	60	17%
4	Very much satisfied	208	60%
	Total	350	100

Table 18 shows that 60% of the students are very much satisfied with the e-resource facility provided to them, which is quiet a nice result. However 17 % of the students are satisfied and 15% are partially satisfied whereas 8% students are not satisfied with

the e-resources available to them, there may be some reasons behind the dissatisfaction which may be pointed out and reduced.

5. FINDINGS

- Most of the students in IPS Academy are using internet in which number of daily users of internet is high.
- The Most popular search technique among students is Title search, whereas Advance search and Keyword search is also preferred by some of the students.
- Majority of the students (52%) search Course oriented Information through the E-ressources, which shows the positive Impact of the e-ressources over the studies.
- PDF file format is more popular for searching information than other file formats like ppt, doc etc. among the students of this Academy.
- In IPS Academy e-resources are being searched by the majority of the students on daily basis
- It was found that most of the students access the e-resources in Library which shows the satisfactory network services of Library.
- Most of the students are using e-resource to study about their respective subjects. It reveals that students of this institute are more cocerned about their cource.
- Most of students preferred e-journal & e-book for gathering Information. Some students preferred newspaper in electronic format whereas very few numbers of the students preferred thesis and dissertations for literature search.
- The Analysis reveals that due to low connectivity of internet, the students are facing problems while accessing e-resources. The action should be taken to overcome this problem.
- Most of the students are satisfied with the e-resource facility provided to them, which are quiet a nice result. However some of the students are less satisfied due to some reason which needs to find out and solve them.

6. SUGGESTIONS

On the basis of findings, the following suggestions are put forward to improve the use of e-resources in IPS Academy Indore, among students.

- User studies should be conducted to know about electronic information needs of users as well as problems they are facing while searching information through e-Journal and some orientation/awareness programs may be organized at the beginning of academic session.
- Extra bandwidth should be sought by the Institute so as to provide faster access that will save users

time, thus becoming a source of motivation to use e-journals. This will also solve the problem of slow downloading.

- The Library should continue to provide printed editions in addition to online access to journals.
- There is a need for the skilled library professional to manage the journal archive carefully. An electronic archive should be provided wherever possible.
- Some more computer terminals are needed in Library so that user can facilitate the e-resources more frequently.
- This study indicates that usefulness of conventional (printed) resource is still significant. Therefore, the IPS Academy, Indore should continue to monitor its conventional collections for print/ electronic balance and not ignore its paper copy provision.

7. CONCLUSIONS

Advancement of information technology has brought many changes in libraries. It made easier to access information so that all digital information such as databases, full text journals etc, can be accessed through computers on the network both at work place and from home. Information professionals have to switch over to new methods and techniques for handling e-resources. To provide e-resource facility and access to online information, Libraries should first formulate a policy and a guideline for the same. Secondly, they should develop local area networks, content creations through digitization, software/hardware procurement etc.

The Libraries should also adopt a proper method for long-term preservation of the e-collections for future use and access. The appropriate user interface will make easy to facilitate the information services to the patrons. In present trends of information needs, libraries should take the essential pre-requisite steps to keep pace with developed technological aspects. Libraries should be automated, digitized and self-sufficient to enhance the access approach of users towards electronic information. They should develop qualitative as well as quantitative electronic collections for their successful future. The use of e-resources is expanding its boundaries to a greater extent to fulfill the research objectives of an individual.

It is concluded that the State Government and College Management will have to give attention towards the establishment and maintenance of e-libraries for fulfill the needs of the users of the Institute.

निष्कर्ष

सूचना प्रौद्योगिकी की प्रगति ने पुस्तकालयों में कई बदलाव किए है। यह सूचना प्राप्ति को आसान बनाता हैं जिसके कारण सारी डिजिटल सूचना जैसे डिजिटल डाटाबेस, पूर्ण पाठ जरनल आदि

को कार्यस्थल और घर पर नेटवर्क से जुड़े कम्प्यूटरों से प्राप्त की जा सकती हैं। सूचना पेशेवरों को ई–संसाधन के संचालन के नई तरीकों और तकनीकों की तरफ बढ़ना चाहिए। पुस्तकालयों को एक नीति और दिशानिर्देश बनानी चाहिए जो ई–संसाधन सुविधा और आन–लाइन सूचना प्रदान करती हैं। दूसरा, इन्हें लोकल क्षेत्र नेटवर्क को विकसिक करना, डिजिटलकरण से साम्रगी (कांटेट), सापटवेयर/हार्डवेयर की खरीद आदि करना चाहिए।

पुस्तकालयों को भविष्य के उपयोग हेतु ई–संसाधनों की लंबी अवधि के संरक्षण के लिए एक उचित विधि को अपनाना चाहिए। उपयुक्त उपभोक्ता पटल (इंटरफेस) उपभोक्ता के लिए सूचना सेवा की सुविधा आसान कर देगा। वर्तमान प्रचलन में सूचना संबंधी आवश्यकताओं की पूर्ति हेतु, पुस्तकालयों को विकसित तकनीकी पहलुओं से समगति रखने के लिए आवश्यक पूर्वाकांक्षित कदम उठाने चाहिए। पुस्तकालयों की उपभोक्ताओं को इलैक्ट्रॉनिक सूचना की प्राप्ति पद्धति को स्वचालित, डिजीटल और आत्मनिर्भर होना चाहिए। व उनके सफल भविष्य के लिए उत्तमात्मक और मात्रात्मक इलैक्ट्रॉनिक संग्रह का विकास करना चाहिए। ई–संसाधनों के उपयोग की सीमाओं का विस्तार को एक बडी हद तक बढाना चाहिए जिससे किसी व्यक्ति के अनुसंधान के उद्देश्यों को पूरा किया जा सके।

यह निष्कर्ष निकलता हैं कि राज्य सरकार और कॉलेज प्रबंधन को संस्थान के उपभोक्ताओं की जरूरत की पूर्ति हेतु ई–पुस्तकालय की स्थापना और रखरखाव की तरफ ध्यान देना चाहिए।

REFERENCES

1. Internet and Mobile Association of India. Internet in India 2013. http://www.iamai.in [Accessed on 10 December 2014]

2. Singh, Shelley. After hitting 100 million, Facebook now aims at 1 billion users in India. 2014. http://articles.economictimes.indiatimes.com/2014-04-08/news/48971129_1_access-facebook-1-billion-users-javier-olivan [Accessed on 10 December 2014]

3. Griffey, Jason. Mobile Technology & Libraries. Facet Publ., London, 2010. http://www.libsuccess.org/index.php?title=M-Libraries [Accessed on 10 December 2014]

4. Cummings, Joel; Merrill, Alex; and Borrelli, Steve. (201n 10 December 10, 2014]

5. Cao, Y., Tin, T., McGreal, R., Ally, M., & Coffey, S. The Athabasca University mobile library project: increasing the boundaries of anytime and anywhere learning for students. In Proceedings of the International conference on communications and mobile computing (IWCMC), July 3-6, 2006, Vancouver, British Columbia, 2006.

6. Eqbal, Monawwer. Use of Electronic Journals by the Research Scholars of Faculty of Engineering: A Study of A.M.U. Libraries without Boundaries: Reaching the Unreachable in Knowledge (NACLIN). Aligarh Muslim University, Aligarh, November 20-23, 2007.

7. Kumar, Shiv and V. K. Grover. Electronic Journals: Impact on Scholarly Communication, User and Library. Library Herald. 45(4), 2007. p326

8. Ani, Okon E. and Ahiauzu, B. (2008). Towards effective development of electronic information resources in Nigerian University Libraries. Library Management. 29(6/7); 2008. p504 –514.

9. Varma, Vandana. (2006-07).Electronic resources in college Library of Indore cities: An Analytic Study. Devi Ahilya University, India. Master's Dissertation. 2006-07. p21-33 (Unpublished).

5. http://en.wikipedia.org/wiki/E-newspaper [Accessed October 2014]

6. www.ipsacademy.org [Accessed October 2014]

7. http://library.igcar.gov.in/html/electronic resources.htm [Accessed November 2014]

8. http://www.eresources.com [Accessed November 2014]

आईआईटी मुम्बई के सिविल इंजीनियरिंग शोधार्थियों में ई–जर्नल के उपयोग और प्रभाव : एक मूल्यांकन

Electronic Journal Usage and Influence among Civil Engineering Researchers at IIT Bombay: An Evaluation Study

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सारांश

इलैक्ट्रॉनिक जर्नल (ई–जर्नल) आधुनिक शैक्षणिक पुस्तकालय का एक अभिन्न भाग हैं। ये उन्नत प्रयोक्ता–अनुकूल साधनों के साथ तत्क्षण उपलब्धता प्रदान करते हैं जिनका गुणवत्ता और किए जाने वाले शोध की गुणवत्ता पर अत्यधिक प्रभाव पड़ता है। यह अध्ययन आईआईटी बांबे, भारत में सिविल इंजीनियरिंग विभाग में शोधार्थियों के बीच इलेक्ट्रॉनिक जर्नल के प्रभाव की जांच करने का प्रयास करता है। शोध दो चरणों में किया जाता हैः (1) प्रथम भाग शोधार्थियों के बीच इलेक्ट्रॉनिक जर्नल के प्रभाव की गुणात्मक तलाश करता है और (2) दूसरा भाग शोध संबंधी गतिविधियों पर मात्रात्मक प्रभाव की जांच करता है। प्रथम भाग के लिए एक सर्वेक्षण किया गया और द्वितीय भाग के लिए सांख्यिकीय विश्लेषण किया गया। सर्वेक्षण परिणामों की सहायता से ई–जर्नलों के संबंध में शोधार्थियों की जानकारी, ऑनलाइन सर्च इंजनों को पसंद किए जाने, औसत सम्पर्क आवृत्ति और वर्तमान पुस्तकालय सुविधाओं से संतुष्टि के स्तर की जांच की गई। सांख्यिकीय विश्लेषण ई–जर्नल उपयोग, उपयोग की दर और प्रकाशन की दर के संबंध में मूल्यांकन मानदंडों का प्रत्यक्ष आकलन प्रदान करता है। यह पाया गया कि शोधार्थी ई–जर्नलों से परिचित हैं और शोधकार्य करने में उनका प्रभावी रूप से उपयोग कर रहे हैं। सांख्यिकीय आंकड़े इस बात की भी पुष्टि करते हैं कि आईआईटी बाम्बे के सिविल इंजीनियरिंग विभाग में शोधार्थियों के बीच ई–जर्नल उपयोग की बढ़ती दर का प्रकाशनों पर सकारात्मक प्रभाव पड़ा है।

ABSTRACT

Electronic journals (e-journal) are an integral part of modern academic library.They provide instant access with advanced user-friendly tools that have great influence on quality and quantity of research conducted. This study attempts to explore e-journals' influence among researchers in the Civil Engineering Department of Indian Institute of Technology Bombay (IIT Bombay), India. The research was carried out in two folds: (1)the first part qualitatively explores the influence of e-journalsamong the researchers and (2) the second part investigates the quantitative impact on research related activities. A survey was conducted for the first part and statistical analysis was performed for the second part. A comprehensive understanding of researchers' familiarity, preference of online searches engines, average access frequency and satisfaction level with current library facilities related to e-journals were investigatedfrom the survey results. The statistical analysis provides the direct assessment of evaluating parameters for e-journal usage, rate of usage and rate of publication. It was observed that researchers are familiar with e-journals and using them effectively in conducting research. The statistical data also confirms that the increasing rate of e-journal usage has positive impact onpublications among researchers in the Civil Engineering Department of IIT Bombay.

Keywords: e-journals, rate of usage, academic library, civil engineering

1. INTRODUCTION

Electronic journals (E-journals) had changed the accessibility and usability of scholarly journal articles. The e-journal articles with advanced and user-friendly tools that allow highlighting text, copy relevant information, searching keywords, accessing fromportable electronic devices, etc. are helping researchers in many ways. These features are saving time, enhancing quality of work and overall improving the research capability. Modern library system plays a vital role in effective and efficient usage of e-journals and has the capability of disseminating information electronically and as well as traditionally. In a traditional approach, journals are scientifically archived by maintaining the printed version with proper indexing facility. This process requires physical space and continuous effort towards

managing and maintaining the printed versions. Accessing information in a traditional method requires users to visit library during its operational hours, read and if required make copy of the information. On the other hand, when same information is available online, it can be accessedcomfortably at any timeand anywhere with the help of electronic devices. This information can easily be stored in the electronic devices, without wasting papers. It definitely saves time and is environmental-friendly too.

Journals are the primary media to publish scholarly and scientific research work. Though the electronic-version of full-text research-articles have been available since early 1980s, it is in 1997, the electronic-version of full-text scholarly journals were first made available to the research community[1]. Though it is popular for its instant accessibility feature, only a few libraries attached to the academic institutions of national importance like Indian Institute of Technology (IIT), Indian Institute of Management (IIM), Nation Institute of Technology (NIT), reputed Central Universities and some Research and Development Organizations have individual e-journal subscription in India. Recently,many academic libraries in India are exploring the alternative means to access e-journals through consortia-based subscription such as the Indian National Digital Library in Engineering Sciences and Technology (INDEST), University Grants Commission initiated UGC-Infonet, etc.[4 & 5]. Though, this approach may help in overcoming the financial constraint of the libraries, the user cost effectiveness of e-journal subscriptions is yet to be explored meticulously.

The general usage and impact of electronic resources (e-resource) and e-journals on researchers have been studied and reported from India and as well as from abroad. *Nicholas[4], et al.* studied usage statistics of Science Direct and Oxford Journals database for understanding the information seeking behaviour of researchers in the United Kingdom. They have concluded that researchers preferred e-journals; and computer accesslog data provide the user behavior with high accuracy. A survey among faculty members in science, technology, medicine and social sciencesconducted by *Tenopir[5], at al*., Voorbij and Ongering[6], and Boncerino and Molteni[7] concluded that the average number of e-journal reading continues to increase over the years. However, the time spent in reading articles is decreasing sharply[5]. Atilgan and Bayram[8] found that the most popular electronic databases for searching scholarly articles among faculty members at Ankara University are Web of Science, Science Direct and EBSCO. Similarly, a survey conducted among post-graduate students by Doraswamy[9] concluded that e-journals and e-resources are accessed on regular basis; however, the trend in University of Mysore,

India was not promising in 2007[10]. So far, the impact of e-journals among Civil Engineering (CE) researchers is not studied either in India or abroad. Hence, this paper attempts to explore the usage and impact of e-journals on CE researchers in Indian Institute of Technology (IIT) Bombay.

2. METHODOLOGY

The primary objective of this study is to understand the influence of e-journals among researchers in the CE department of IIT, Bombay. The study was conducted in two parts. In the first part, a survey was conducted to qualitatively comprehend the influence of e-resources among the researchers in the CE department. In the second part, statistics of e-journals related to CE subjects and departmental publication statistics were analyzed to quantitatively assess the impact of e-journals on research. The obtained information from the above two parts is further analyzed for meaningful interpretations to find correlation between e-journal usage and its influence among researchers.

3. E-JOURNAL IMPACT SURVEY

A survey was conducted between 16th and 30th June 2014 in the academic year of 2013-14 to qualitatively evaluate and assess the impact of e-journals among researchers in CE department of IIT Bombay. This survey was based on a fixed questionnaire and researchers were either interviewed face-to-face or requested to fill-up an online survey form (i.e., the same questionnaire). The objective of the questionnaire based survey was to explore:
- Researchers' familiarity with e-journals
- Popularity ofonline search engines to access e-journals
- Frequency of accessing e-journals
- Level of satisfaction withe-journals' current features and IIT Bombay library facility

A comprehensive list of post-graduate researchers enrolled in the CE department was obtained from the Academic Section of IIT Bombay.A total of 299 post-graduate researchers were on-roll in the CE department during the academic year 2013-14.However, out of all researchers, 129 participated and responded to this study (i.e. 43.14% participation rate). At the time of the survey,the final year master-degreeresearchers were finalizing their thesis/project report and doctoral-degree researcherswere preparing their annual progress report. The online survey form was prepared to reach researchers who were not available for face-to-face questionnaire based interview. The online link of thissurvey form along with short description ofthe study was emailed to the researcherson 20th June 2014 anda follow-up reminder email was sentin the following week.Overall, the online responseswere very low (only 17 out of

129 responses were obtained online).Screenshot of the online questionnaireis shown in Fig. 1.

4. ANALYSIS AND RESULTS OF SURVEYED DATA

Researchers were asked to rate their familiarity with e-journals and other relevant e-resources on a scale of 1 to 5, where '1'represents not familiar and '5'represents very familiar. A whopping 75.96% of researchers graded themselves between 3 and 5. The response may be interpreted as their high familiarity with e-journals and e-resources.This survey also attempted to identifythe level of comfortin finding required contents from the e-resources available in the IIT Bombay library system.About 90.96% researchers responded positively and were comfortable in finding the required information. This indicates majority of the researchers in the department are aware of available e-journals and using the institute library system moderately to extensively in their day-to-day research related activities.

A researcher at IIT Bombay can either visit the library website or Google website to search a journal paper they are interested in. Online search in library's websitewould provide related scholarly papers from journalssubscribed by IIT Bombay; whereas, Google's website would provide all related articles from various sources irrespective of the institute's subscription status.It was interesting to observe that 57.36% of the researchers preferred to use library website while 30.23% of them preferredGoogle website to search journal papers. The remaining researchers used other search engines. This finding can be interpreted as researchers are interested in articles that they have full access and are readily downloadable.

The e-journals at IIT Bombay and elsewhere are available round the clock. It would be interesting to note the frequency at which the researchers use the available facility. A few questions were incorporatedto understand when researchers first started using e-journal or e-resource and their present usage frequency. It was observed that about 64% researchers use the e-resource available in IIT Bombay library system at least once in a week. Out of all respondents, approximately 67%stated that they have been using e-resourcesfor the lasttwo yearsonly, whereas about 31% started using it more than two years back. Aconsiderable number of post-graduate researchers, particularly the master-degree researchers, got their first exposure to e-resources after joining in IIT Bombay.This may explain whyrelatively high percentage of researchers hasstarted using e-resources only about two years back.

E-journals provide many features to the user. These features includeability to searchinformation, highlighting text, downloadingthe scholarly research-articles to personal electronic devices, etc. Hence, the survey also intend to capture the level of satisfaction with e-journals' current features and facilitiesprovided by the IIT Bombay library system. It was observed that 56% of the researchers in the CE department were satisfied with the available e-resource related library facility and its access speed. Also, more than 75% researchers did not have any difficulty in finding relevant e-journals from the IIT Bombay library system.

A good and user-friendly e-journal access interface has great impact on its usage. It was observed thatabout 61% of the researchers were satisfied with the present interface and about 66% researchers were happy with its search and retrieval capability.The online applications are not always compatible with various available online web browsers. However, about 65% of the researchers in the CE department were satisfied with the compatibilityof e-journal web interfaces in different web browser and its capability of displaying the contentin various hardware configurations of available personal electronic devices. Some researchers (almost 26%) preferred to mark their response as 'neutral' when asked about their level of satisfaction with e-journal features.While reviewing the name of e-journals noted by the researchers during the survey, it was observed that most researchers preferred e-journals publishedby ASCE, ELSEVIER and ASTM.

Figure 1. Sample screenshot of online questionnaire.

5. E-JOURNAL USAGE STATISTICS AND IMPACT ANALYSIS

The IIT Bombay library system is subscribing e-journals since 1990-91 academic year and has subscription of more than 230Civil Engineering related e-journals from major publishers all over the world. The research team contacted all major CE related e-journal publishers for usage statistics data. Publishers like Wiley, Elsevier, Taylor and Francis, Sage, ASCE, World Scientific and Transportation Research Board provided the requested information for the last three academic years (i.e., 2011-12, 2012-13 and 2013-14). However, it was difficult to receive the samefrom IEEE and ProQuest. After eliminating e-journals with inconsistent data, a total of 38 CE related e-journals were considered in this analysis.The post-graduate researchers and faculty members review journal articles for their research. Hence, the usage statistics per academic year is normalized by dividing the total number of journal articles accessed with the total number of registered post-graduate researchers and faculty members in the CE department; the number of researchers and faculty is obtained from Academic Section of IIT Bombay and CE departmental annual report respectively.The normalized rate of usage statistics of the CE related e-journals considered in this study is presented in Figure 2. The bar chart presented in the figure shows constant increase in e-journal usage amongst CE researchers for the last three academic years (i.e. 2011-12 to 2013-14).

In this study, the number of journal and conference publications by faculty members is considered as the tangible parameterto evaluatethe effectiveness of e-journal usage. Generally, the post-graduate researchers conduct research under the supervision of a faculty member and almost all publications by the post-graduate researchers are coauthored by at least one faculty member from the department. A faculty member may also have publications from their individual effort or from collaborative effort with other institutes or groups not affiliated to IIT Bombay. Hence, to avoid duplication of publication data, publications only by the faculty members are considered for the evaluation. Every academic year, the CE department publishes an annual report listing journal and conference publications in that academic year by faculty members associated with the department. The annual report also lists the name of the faculty members available in the department on institute's payroll. For each academic year considered, this information is normalized against the total number of available faculty members in the department. As mentioned above, post-graduate researchersconduct research under faculty member's guidance and hence not considered asindependent
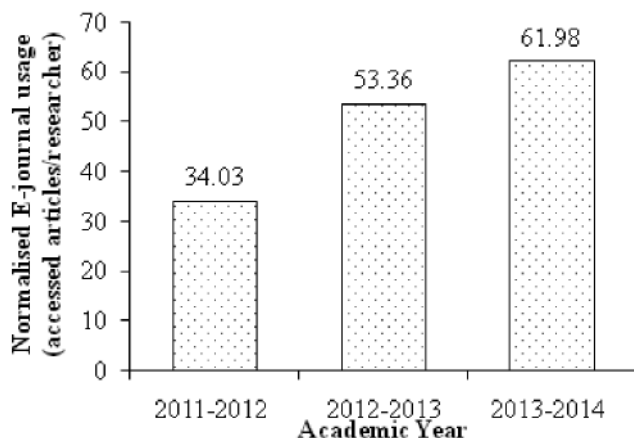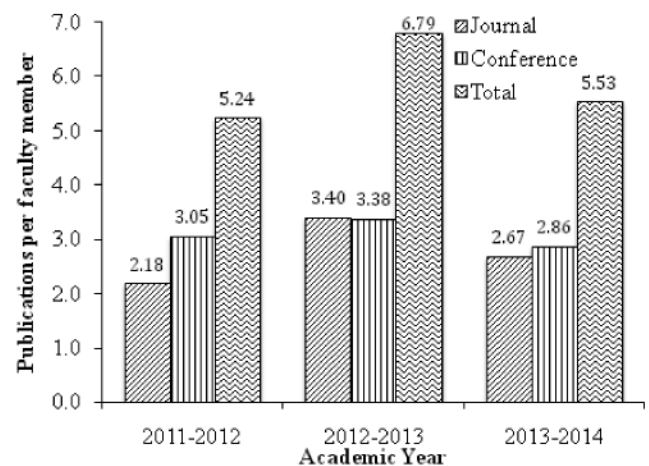
Figure 3. Publication statistics of faculty members in the CE department.

researchers. Therefore, the post-graduate researchers are excluded in normalization of publication data. The normalized publication statistics is presented in Figure 3. It is observed that journal and conference publication per faculty member had reduced slightly in the academic year 2013-14. This may be because of five new faculty members, who joined in 2012-13 and 2013-14 academic year,werestill in the process of establishing their research team.

6. CONCLUSION AND DISCUSSION

Electronic journals have become an integral part of modern day research in the CE department at IIT Bombay. The post-graduate researchers are familiar with the e-journals and are using the available facilities effectively. The survey result indicates that researchers mainly depend on library website for searching journal articles rather than using any external search engine such as Google. Though three academic years could be relatively short durationto comment on the increasing trend of e-journal usage, the rate of usage is definitely impressive.Similarly the rate of publications by faculty members in the department is also commendable. Based

Figure 2. e-Journal rate of usage statistics for CE researchers.

on the survey responses, researchers are satisfied with the institute library facilities, which include the list of available e-journals. Hence, the present list of CE related e-journals mightbe used as a reference for procurement of e-journals at any new institute with CE department (e.g., new IITs).

The study was conducted among researchers in the CE department at IIT Bombay. Definitely a larger dataset from several other institutes in India and abroad is required to infer a generic conclusion on usage trend of e-journals among CE researchers. A detail study on this topic would help in understanding the requirements of CE researchers better and could be used in developing library information systems in future. It can also be used in designing training programs for new researchers using the e-journal features for the first time. Overall, it can improve the quality of research and reduce the time spent in searching for related and relevant information required to conduct comprehensive literature review.

7. ACKNOWLEDGMENT

The authors are thankful to the publishers such as Elsevier, ASCE, Wiley, Taylor and Francis, World Scientific, Cambridge, Sageand Transportation Research Board for providing the usage statistics data of their e-journals.

निष्कर्ष

इलैक्ट्रॉनिक जर्नल (ई–जर्नल) आधुनिक शैक्षणिक पुस्तकालय का एक अभिन्न भाग हैं। ये उन्नत प्रयोक्ता–अनुकूल साधनों के साथ तत्क्षण उपलब्धता प्रदान करते हैं जिनका गुणवत्ता और किए जाने वाले शोध की गुणवत्ता पर अत्यधिक प्रभाव पड़ता है। यह अध्ययन आईआईटी बांबे, भारत में सिविल इंजीनियरिंग विभाग में शोधार्थियों के बीच इलेक्ट्रॉनिक जर्नल के प्रभाव की जांच करने का प्रयास करता है। शोध दो चरणों में किया जाता है: (1) प्रथम भाग शोधार्थियों के बीच इलेक्ट्रॉनिक जर्नल के प्रभाव की गुणात्मक तलाश करता है और (2) दूसरा भाग शोध संबंधी गतिविधियों पर मात्रात्मक प्रभाव की जांच करता है। प्रथम भाग के लिए एक सर्वेक्षण किया गया और द्वितीय भाग के लिए सांख्यिकीय विश्लेषण किया गया। सर्वेक्षण परिणामों की सहायता से ई–जर्नलों के संबंध में शोधार्थियों की जानकारी, ऑनलाइन सर्च इंजनों को पसंद किए जाने, औसत सम्पर्क आवृत्ति और वर्तमान पुस्तकालय सुविधाओं से संतुष्टि के स्तर की जांच की गई। सांख्यिकीय विश्लेषण ई–जर्नल उपयोग, उपयोग की दर और प्रकाशन की दर के संबंध में

मूल्यांकन मानदंडों का प्रत्यक्ष आकलन प्रदान करता है। यह पाया गया कि शोधार्थी ई–जर्नलों से परिचित हैं और शोधकार्य करने में उनका प्रभावी रूप से उपयोग कर रहे हैं। सांख्यिकीय आंकड़ें इस बात की भी पुष्टि करते हैं कि आईआईटी बाम्बे के सिविल इंजीनियरिंग विभाग में शोधार्थियों के बीच ई–जर्नल उपयोग की बढ़ती दर का प्रकाशनों पर सकारात्मक प्रभाव पड़ा है।

REFERENCES

1. Montgomery, C.H. & Sparks, J.L.The transition to an electronic journal collection. *Serials Review*, 2000, **26**(3), 4-18.

2. Madhusudhan, M. Use of UGC-Infonet e-journals by research scholars and students of the University of Delhi, Delhi: a study. *Library Hi Tech*, 2008, **26**(3), 369-386.

3. Sahoo, B.B.& Agarwal, G.P. INDEST-AICTE Consortium: A decade of service for engineering, science and technology community of the country. *Annals of Library and Information Studies*, 2012, **59**(3), 170-180.

4. Nicholas, D.; Williams, P.; Rowlands, I. & Jamali, H.R. Researchers' e-journal use and information seeking behavior. *J. Info. Sci.*, 2010, **36**(4).

5. Tenopir, C.; King, D.W.; Edwards, S. & Wu, L. Electronic journals and changes in scholarly article seeking and reading patterns. *In* Aslib Proceedings, 2009, **61**(1), 5-32.

6. Voorbij, H. & Ongering, H. The use of electronic journal by Dutch researchers: a descriptive and exploratory study. *J. Academic Librarianship*, 2006, **32**(3).

7. Boncerino, A.G.& Molteni, V.E. Electronic journals collection in Argentine private academic libraries. *The Electronic Library*, 2007, **25**(1).

8. Atilgan, D. & Bayram, O.G. An evaluation of faculty use of the digital library at Ankara University, Turkey. *J. Academic Librarianship*, 2006, 32, 86-93.

9. Doraswamy, M. Use of digital resources by MTech students in KoneruLakshmaiah College of Engineering. In Proceedings of the National Convention on Knowledge, Library and Information Networking (NACLIN 2006), Jammu, J&K, 2006.

10. Nikam, K. &Pramodini, B. Use of e-journals and databases by the academic community of University of Mysore: a survey. *Annals of Library and Information Studies*, 2007, **54**(7), 718.

भारतीय सांख्यिकीय संस्थान, बंगलौर केंद्र एवं बंगलौर विश्वविद्यालय के पुस्तकालयों में उपयोगकर्ता के व्यवहार का विश्लेषण : एक तुलनात्मक अध्ययन

User Behaviour of Libraries of Indian Statistical Institute, Bangalore Centre and Bangalore University : A Comparative study

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सारांश

इस पेपर का उद्देश्य पुस्तकालय संग्रहण, संगठन, आईटी आधारित सेवाएं और सुविधाएं पर उपयोगकर्ता की संतुष्टि के स्तर को जांचना हैं। यह आलेख उपयोगकर्ता जागरूकता, सूचना स्त्रोत का उपयोग, भारतीय सांख्यिकी संस्थान, बंगलौर केंद्र और बंगलौर विश्वविद्यालय पुस्तकालय पर किए सर्वेक्षण के परिणामों को प्रस्तुत करता है। यह अध्ययन दोनों संस्थानों के छात्रों से विविध प्रकार की प्रक्रिया पाता है जिसने तुलनात्मक अध्ययन के लिए मार्ग प्रशस्त किया है। पुस्तकालयों में उपलब्ध सूचना स्त्रोतों और सेवाओं का उचित उपयोग करने के लिए उपयोगकर्ताओं और पुस्तकालय कर्मचारियों के प्रशिक्षण की आवश्यकता है। उपयोगकर्ता अध्ययन को परिणाम मापक रूप में मान सकते है परन्तु उन्हें पुस्तकालय सेवाओं, संग्रह, सुविधाओं, और कर्मचारियों का उपयोगकर्ता अनुभवों और विचारों पर प्रभाव का उल्लेख करना होगा।

ABSTRACT

The aim of this paper is to examine user perceptions regarding level of satisfaction with library collections, organisation, IT-enabled services, and facilities. This paper presents the results of a survey conducted on user awareness and the use of information sources and services of Indian Statistical Institute, Bangalore Centre (ISIBC) and Bangalore University library. The study found varied type of responses from the students of both the institutions which paved the way for a comparative study. There is a need for training the users and library staff to make appropriate use of the information sources and services made available in the libraries. The user study can be referred as an 'outcome measure' because, they do indicate the impact of library services, collections, facilities, and staff on user experiences and perceptions.

Keywords: User survey, comparative study, questionnaire, user satisfaction

1. INTRODUCTION

An information system comprises of a heterogeneous user-community. Though a majority of the users of a system would come together for a particular purpose and are comparable by one or two criteria but they are divided among themselves by many individual characteristics. Thus user studies involve thorough investigations of the use and users (including non-users and potential uses and users) of documents, information, communication channels, information sources and systems. Wilson[1] writes that as the first user study is commonly recognised a publication at "*The Royal Society*'s" conference in London in 1948. Pors[2] writes that a common pattern in studies of library users is that users are satisfied with library services. This may, however, be related to low expectations

of what service they should expect, which again is associated with a low level of knowledge about the purposes and capabilities of libraries.

2. METHODOLOGY

Survey was conducted on Indian Statistical Institute, Bangalore Centre (ISIBC) and Bangalore University (BU) library users following the questionnaire method. A questionnaire is a research instrument consisting of a series of questions and other prompts for the purpose of gathering information from respondents. In this study both paper-and-pencil and computerized questionnaire administration methods have been followed to collect the data from the patrons of both the libraries. The questionnaire was prepared to make a comparative study between the Indian Statistical Institute, Bangalore

Centre (ISIBC) and Bangalore University (BU) library on the basis of the library collections, services and level of satisfaction. Total 131 user response were received out of which 60 are from ISIBC which is collected via online questionnaire and 71 from BU collected via field survey. Since ISIBC has Statistics & Mathematics Unit (SMU), Economic Analysis Unit (EAU), Documentation Research & Training Centre (DRTC) and Computer Science departments, hence in BU we confined the data collection from students of these departments only.

Though the survey questionnaire was simple, impersonal, and relatively brief, yet the respondents hurried to answer the questions and being reluctant often skipped few of them leading to occasional decline in the quality of responses. It was difficult to get hold of the respondents. Often they refrained to provide details in case of online submission of questionnaire. Many of the respondents seemed to be afraid of filling up the questionnaire.

3. DATA ANALYSIS

- It is noticed that in ISIBC, most of the respondents are male which is 45 (75%) while in BU most of the respondents are female which is about 40 (56%). Table 1.

Table 1. No. of respondents in ISIBC and BU

	ISIBC	Percentage	BU	Percentage
Male	45	75	31	44
Female	15	25	40	56
Total	60	100	71	100

3.1 Frequency of Library Visit

We observed that most of the BU students (61%) visit the library on a daily basis as compared to the ISIBC students who visit mostly once in a week (28%). The students of ISIBC live in campus hostels and are enabled with 24x7 wi-fi service. This may be a reason for their less frequent visit to the library (Table 2).

Table 2. No of visits to the library

Frequency	ISIBC	Percentage	BU	Percentage
Daily	4	7	44	61
At least once a week	16	28	21	29
Once every three weeks	9	16	1	2
Once a month	12	21	4	6
Once every six months	7	12	0	0
Once a year	3	5	1	2
Never	2	3	0	0
Other	5	9	0	0

3.2 Preferred Library Timings

52% of ISIBC students and 60% of the BU students selected 3-5 pm as their convenient time while 25% of ISIBC students preferred 11am-1pm but 22% of BU students preferred 1-3 pm. It could be inferred that majority of the students of both ISIBC and BU wanted the library hours to be between 3-5 pm. The students are more aware of the reference documents they need to consult after their classes in the first half. This may be a reason for their preferred timings (Table 3).

Table 3. Preferred library hours

	ISIBC	Percentage	BU	Percentage
9.00-11.00 am	3	5	8	12
11.00 am-1.00 pm	15	25	4	6
1.00-3.00 pm	11	18	16	22
3.00-5.00 pm	31	52	43	60

3.3 Reasons to Use Library

41% of the ISIBC students use the library for reference/research purpose compared to 17% of the BU students. While 42% of the BU students use library for work/study related matters compared to 29% of the ISIBC students (Table 4).

Table 4. Main reasons for using the library

	ISIBC	Percentage	BU	Percentage
To work/study	29	29	30	42
To borrow best sellers	6	6	9	13
For reference/research	41	41	12	17
To borrow videos, CD's	3	3	2	2
To use the copy machine	2	2	2	2
To read magazines	8	8	2	2
To tread newspapers	3	3	4	6
To use the internet	0	0	4	6
To use govt. publications	5	5	2	2
To use computers	0	0	4	6
Others	3	3	2	2

3.4 Availability of Documents

When enquired whether they find the books and other materials that they are looking for in the library, 69% of the ISIBC students replied that they find it sometimes compared to 56% in case of BU students (Table 5).

3.5 Reasons of Non-availability

When enquired about the reason for non-availability of the documents most of the ISIBC students (29%)

Table 5. Availability of documents

	ISIBC	Percentage	BU	Percentage
Always find	10	17	15	21
Sometimes find	40	69	40	56
Rarely find	8	14	10	14
Never find	0	0	5	7
Other	0	0	1	2

replied that the item was either checked out or they could not find the material as compared to the BU students (36%) who replied that they could not find material on their required subject. The classification scheme followed in ISIBC library is Colon Classification and the library is open access. Hence it can be assumed that many of the students may not understand and find out their desired document (Table 6).

Table 6. Reason for non-availability of any document

SNo	Reasons	ISIBC	Percent -age	BU	Percent -age
1.	Item was checked out	25	29	16	23
2.	Had no material on the subject	19	22	25	36
3.	I could not find the material	25	29	11	15
4.	Staff could not find the material	9	10	3	4
5.	The computers were down	0	0	5	7
6.	The computers were all in use	1	1	5	7
7.	I don't know to use computers	0	0	0	0
8.	Requested from other library	1	1	6	8
9.	Others	6	7	0	0

3.6 Satisfaction Level

When enquired about their satisfaction level regarding the library services rendered, most of the ISIBC students are satisfied (41%) compared to BU students who are also mostly satisfied (49%). While 34% of the ISIBC students are not fully satisfied with the services compared to 42% of the BU students who are not fully satisfied. ISIBC library has few staffs as compared to BU library. This may be a reason that eventually leads to the dissatisfaction among the students of ISIBC (Table 7).

3.7 Rating of Library Services

Users were asked to rate the library services like (internet access, computer and printer services, photocopy services, Inter Library Loan (ILL), online

Table 7. Rating of library services on the basis of satisfaction

	ISIBC	Percentage	BU	Percentage
Very dissatisfied	3	5	1	2
Dissatisfied	6	10	4	5
Slightly dissatisfied	11	19	10	14
Slightly satisfied	10	17	15	21
Satisfied	24	41	35	49
Very satisfied	3	5	6	9
Other	1	2	0	0

services (website, catalogue, research databases, etc.), collections (books, DVDs, music, newspapers etc.), customer services, etc.), 45% of ISIBC students rated the services as good as compared to 49% of BU students followed by 31% of ISIBC students who rated the services as fair as compared to 23% of BU students (Table 8).

Table 8. Rating of the library services

Rating	ISIBC	Percentage	BU	Percentage
Excellent	5	9	3	4
Good	25	45	35	49
Fair	17	31	16	23
Poor	3	5	11	16
Don't know/ Not applicable	5	9	6	8

4. USER STUDY MODEL

Its aim is to 'model' the interrelationships among concepts used in the field of user study. The figure suggests that information use results from the recognition of some need, perceived by the user followed by the query representation which can be answered by the documentary and other information sources provided by the library staffs after matching the query with the documents. The appropriate documents are then supplied to meet the information need of the users. The users may be satisfied or non-satisfied and in case the users are not satisfied, the query is refined and the following process is continued till the user is satisfied. Fig. 1.

5. RECOMMENDATIONS AND SUGGESTIONS

The recommendations of the students of ISIBC and BU are:

I. List of Additions Required to the Existing Collection and Library Services
(a) ISIBC
• Books of historic interest for mathematicians:
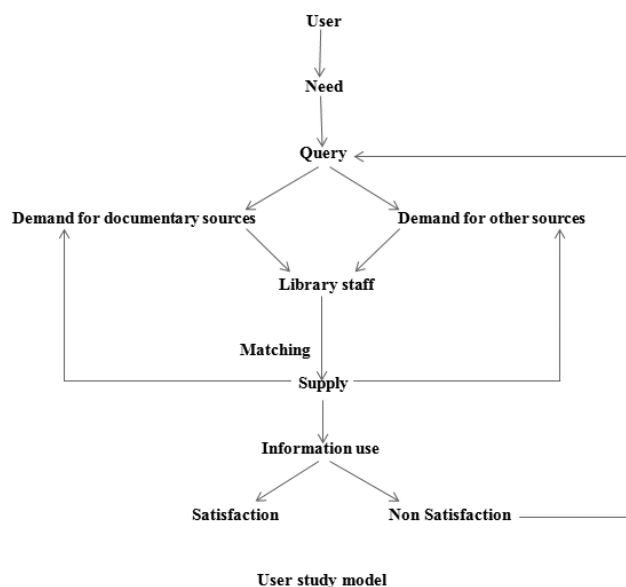
Figure 1. User study model

autobiographies, historic works on mathematical subjects, collected works of mathematicians.
- Increased library hours (atleast till midnight, since ISIBC is residential).
- The library should get more copies of the existing collection of books particularly the international edition books.
- Get newer editions of existing books.

(b) BU
- Computers should be updated with latest software.
- Online search option for books
- Proper shelving for scattered/misplaced books should focus on classification aspect of documents.

II. Changes Required in Library

(a) ISIBC
- Extended hour of operation in the evening.
- Many of the documents should be reclassified and properly placed in the racks.
- Once any document has been taken out from the shelf, it should be kept on the desks and not placed on the shelf by the users themselves.
- Accessioning process should be speeded up, so that readers can get the documents they have requested for.
- A good study room with white boards should be kept open atleast upto 12 o'clock since ISIBC is residential.

(b) BU
- Library should conduct user study and also should provide extended library services.
- Computers are very old, keypad/mouse does not work well should be replaced with new machines.

III. Improvements Required for Better Fulfillment of User Expectations

(a) ISIBC
- After acquisition, book processing and shelving should be faster.
- There should be an email alert on current contents and new arrivals.
- Maintenance, quick service, proper arrangement of books, user friendly staff.

(b) BU
- More computers should be there for use.
- More access to journals.

IV. Best about the Library

(a) ISIBC
- Good collection for domain specific users.
- Calm and peaceful atmosphere for working.
- Collection of relevant and high quality books in a vast number of subjects.

(b) BU
- Library area is very big and it is good place for study.
- Calm and peaceful atmosphere for working.
  There is always a chance for betterment only if you take up the challenge willingly.

6. CONCLUSION

The paper covers user information needs, facilities for meeting those needs, the promotion of library resources and services, user response to those services, the use of information sources, the assessment and justification of existing services. Having identified these factors, it can be concluded that user studies are vitally important for library development since they are a means of determining user needs, the extent to which they are met, user response to library services and the effectiveness of the system; also because they are an effective way for the library to introduce user feedback.

निष्कर्ष

आलेख का निष्कर्ष भाग पूर्व निर्धारित पद्धति के आधार पर उपयोगकर्ता अध्ययन के लिए हुए उपायों को बताता हैं और मतिष्क में इन मूल कारकों जैस उपयोगकर्ता की सूचना जरूरतें, इन जरूरतों को पूरा करने के लिए सुविधाएँ, पुस्तकालय संसाधनों और सेवाओं की प्रगति, इन सेवाओं के लिए उपयोगकर्ता की प्रतिक्रियाएं, सूचना स्त्रोत का उपयोग, मौजूदा सेवाओं का मूल्याकंन और जवाबदेही आदि की पहचान करनी होगी। इन कारकों की पहचान के बाद यह निष्कर्ष निकलता हैं कि उपयोगकर्ता अध्ययन पुस्तकालयों के विकास में अत्यन्त आवश्यक है क्योंकि ये उपयोगकर्ता की जरूरतों को पूरा होने योग्य स्तर तक, पुस्तकालय सेवाओं के लिए उपभोक्ता की प्रतिक्रिया और प्रणाली की प्रभावशीलता बताता हैंय क्योंकि ये उपभोक्ता की प्रतिपुष्टि बताने का प्रभावी तरीका हैं।

REFERENCES

1. Wilson, T. D. On user studies and information needs. *J. Doc.,* 1981, **37**(1), 3–15.

2. Pors, N.O. Users, collection use and online searching: Investigations in Danish public libraries. *Int. J. Info. Library Res.,* 1990, **2**(2), 63–76.

3. http://informationr.net/ir/5-3/paper76.html [Accessed on 20 December 2014].

4. Kumar, A. & Singh, J. Awareness and use of library information resources and services in different universities libraries in Delhi. *J. Library Info. Techno.,* 2010, **10**(2), 19-32.

लेप्टोस्पारोसिस पर साहित्य का प्रमुख पत्रिका में विश्लेषण (2006-2013)
Core Journal Analysis of the Literature on Leptospirosis (2006-2013)

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सारांश

इस लेख में लेप्टोस्पाइरोसिस के क्षेत्र में मेडलाइन डाटा में साहित्य की एक प्रमुख पत्रिका का विश्लेषण प्रस्तुत है जिसे पवमेड में शामिल किया गया है। डाटाबेस में शामिल साहित्य 2006—2013 की अवधि का है। 2006—2013 की अवधि के दौरान पवमेड में शामिल मेडलाइन डाटा के 11767 अभिलेख रिकार्ड्स थे। सभी उद्धृत अभिलेखों का 42.77 प्रतिशत 5033 ''पत्रिका लेख'' का ही था। 517 पत्रिकाओं के कुल 5033 लेख तैयार किये गये हैं। जब इन उद्धृत पत्रिकाओं को 3 मंडलों जोन में विभाजित किया गया तो पहले मंडल में 22 पत्रिकाएं थी जो कि प्रशंसा पत्रों की कुल संख्या का 33.48 प्रतिशत था। दूसरे मंडल में 85 पत्रिकाएं था जबकि उद्धृत पत्रिकाओं का 79.3 प्रतिशत तीसरे मंडल में था। पहले और दूसरे जोन में 36 पत्रिकाएं सामान्य चिकित्सा पद्धति शीर्षक की थीं, 23 सूक्ष्म जीव विज्ञान शीर्षक की थीं, 19 विकृति विज्ञान पेथोलॉजी शीर्षक की थीं, 15 पशुचिकित्सा विज्ञान शीर्षक की थीं, 6 सार्वजनिक स्वास्थ्य शीर्षक से थीं, 4 प्रतिरक्षा विज्ञान इम्यूनोलोजी शीर्षक से थीं और जानपदिक रोग विज्ञान और टेक्नालॉजी शीर्षक में प्रत्येक स 2 पत्रिकाएं थी।

ABSTRACT

This paper presents a core journal analysis of the literature output in the field of Leptospirosis in MEDLINE data which are covered in the Pubmed. The literature covered in the database for the period 2006-2013 was considered. MEDLINE data covered in the Pubmed were 11767 records during the study period 2006 to 2013. 42.77% (5033) of all the cited records were to 'journal articles'. A total of 517 journals were produced 5033 articles. When these cited journals were divided into three zones, only 22 journals fell into zone 1, accounting for 33.48% of the total number of citations. Zone 2 consisted of 85 journals, while 79.3% of the journals cited fell in Zone 3. In zone-1 and 2; 36 frequently cited journals are general medicine titles, 23 in microbiology, 19 in pathology, 15 in Vetnary Science, 6 in public health, 4 in immunology, 2 each in epidemiology and nephrology.

Keywords: Leptospirosis, bradford's law and core journals

1. INTRODUCTION

The term bibliometrics was introduced only in 1969. It indicates a new discipline and employs quantitative methods for analyzing various aspects of written documents. It applies mathematical and statistical analysis to bibliographical units [1]. Bibliometric analysis throws light on the pattern of growth of literature, inter-relationship among different branches of knowledge, productivity, authorship pattern, and degree of collaboration, pattern of collection building, and their use[2]. Scientometrics investigates quantitative aspects of science; it is the quantitative of the science of science, of scientific communication studies and science policy studies[3].

In this paper an attempt has been made to bring the core journals in the field of Leptospirosis.

2. LEPTOSPIROSIS

Leptospirosis is an infectious diseases caused by a particular type of bacteria called a spirochete transmitted by rats as well as by skunks, opossums, raccoons, foxes and other vermin. Leptospirosis occurs worldwide but is most commonly acquired in the tropics. About 100 cases of leptospirosis are reported each year in the U.S. The disease is becoming a greater risk as more people travel to undeveloped areas of the world[4].

3. LITERATURE REVIEW

Several studies on mapping have analyzed allied health journal citations to determine lists of core journals in their fields[5-17]. Ramakrishnan and Rajendran[18] on

Hepatitis B. Krishnamoorthy; Ramakrishnan and Devi[19] studied on diabetes, Ramesh Babu and Ramakrishnan[20] studied on Indian Contributions to the field of HIV/AIDS Ramakrishnan and Thavamani[21] studied on Hepatitis C and they identified core journals.

The review of literature on core journals analysis revealed that so far no quantitative study on 'Leptospirosis' was conducted. Hence the present study.

4. OBJECTIVES

The objectives of this paper are:

i. To examine the growth of 'Leptospirosis' literature in MEDLINE data which are covered in the Pubmed; and

ii. To identify the core journals in the field of Leptospirosis and Bradford's Law of scattering used to identify the same.

5. METHODOLOGY

The records published during the year 2006 to 2013 in the field of Leptospirosis in the MEDLINE data which are covered in the Pubmed (*www.pubmed.com*) which is a free resource that is developed and maintained by the National Center for Biotechnology Information (NCBI), at the U.S. National Library of Medicine (NLM), located at the National Institutes of Health (NIH) was searched and bibliographic details like author, title, publication type, language, year; address of the contributors, country of publications, source etc. were collected. The retrieved records were converted into FoxPro and loaded in SPSS for the purpose of analysis. The keyword 'Leptospirosis' has been used for extracting the number of records available in the above said database. In order to determine the core journals Bradford's law[22] of scattering has been used to bring the core journals in the field of Leptospirosis. Three zones are their marked off. Each zone comprises one-third of the total citations. Journals in zone 1 are cited most frequently, that in zone 2 are cited less often, and those in zone 3 are cited least.

6. LIMITATIONS

This study is confined to a period from 2006 to 2013 MEDLINE data which covered in Pubmed only.

7. ANALYSIS AND DISCUSSION

The data in Table 1 provides a comparative picture of Leptospirosis literature covered by year wise in the database studied. MEDLINE covered 11767 records during the study period 2006 to 2013.

The data about the total of Leptospirosis literature covered in the MEDLINE data which are covered in the Pubmed is shown in Fig. 1. The year 2013 recorded the maximum of 1855 records and the lowest in the year 2006 with 1183 records.

Table 1. Year-wise distribution

Year	Frequency	Percent
2006	1183	10.05
2007	1344	11.42
2008	1246	10.59
2009	1246	10.59
2010	1596	13.56
2011	1589	13.50
2012	1708	14.52
2013	1855	15.76
Total	11767	100.00

Table 2 shows that 42.77 % (5033) of all the cited records were "journal articles", 35.93 % (4228) "Research Support, Non-U.S. Gov't", 8.92 % (1050) "Review", 5.89 % (693) "letter", 3.03 % (357) "Research Support, U.S. Gov't, Non-P.H.S", 1.07 % (126) "Research Support, N.I.H., Extramural" and 0.65 % (77) "Research Support, U.S. Gov't, P.H.S". The remaining 1.74 % was from "Editorial", "News", "Validation Studies", "Multicenter Study", "Randomized Controlled Trial", "Historical Article", "Introductory Journal Article", "Meta-Analysis", "Published Erratum", "Practice Guideline" and "Retracted Publication" in the MEDLINE data which are covered in the Pubmed.

Table 2. Distribution of publication types in the literature of leptospirosis

Pub. type	No. of records	%	Rank
Journal Article	5033	42.77	1
Research Support, Non-U.S. Gov't	4228	35.93	2
Review	1050	8.92	3
Letter	693	5.89	4
Research Support, U.S. Gov't, Non-P.H.S.	357	3.03	5
Research Support, N.I.H., Extramural	126	1.07	6
Research Support, U.S. Gov't, P.H.S.	77	0.65	7
Editorial	49	0.42	8
News	35	0.30	9
Validation Studies	35	0.30	9
Multicenter Study	21	0.18	10
Randomized Controlled Trial	21	0.18	10
Historical Article	7	0.06	11
Introductory Journal Article	7	0.06	11
Meta-Analysis	7	0.06	11
Published Erratum	7	0.06	11
Practice Guideline	7	0.06	11
Retracted Publication	7	0.06	11
	11767	100	

As shown in the Table 3 distribution by zone of cited journals and references in Leptospirosis in the database. A total of 517 journals were produced 5033 articles. When these cited journals were divided into three zones, only 22 journals fell into zone 1, accounting for 33.48 % of the total number of citations. Zone 2 consisted of 85 journals, while 79.3 % of the journals cited fell in Zone 3.

Table 3. Zone-wise distribution of cited journals and references in leptospirosis.

Zone	No. of journals		No. of papers	
	No.	(%)	No.	(%)
Zone 1	22	4.26	1685	33.48
Zone 2	85	16.44	1786	35.49
Zone 3	410	79.3	1562	31.03
Total	**517**	**100**	**5033**	**100**

Table 4 shows that the most frequently cited journals are General Medicine titles with 22.73 %. Of the 22 titles in zone-1, 5 are associated with General Medicine, 4 each with Micriobiology, Pathology and Veterinary Science, 3 with immunology, 1 each with epidemiology and public health.

Table 4. Subject-wise coverage of zone-1 journals in leptospirosis

Subject	Frequency	%	Cumulative %
General medicine	5	22.73	22.73
Microbiology	4	18.18	40.91
Pathology	4	18.18	59.09
Vetnary science	4	18.18	77.27
Immunology	3	13.63	90.9
Epidemiology	1	4.55	95.45
Public health	1	4.55	100
Total	22	100	

Table 5 shows that in zone-2; 31 frequently cited journals are general medicine titles, 19 in microbiology, 15 are pathology, 11 in Veterinary Science, 5 in public health, 2 in nephrology, 1 each in epidemiology and immunology.

Table 5. Subject-wise coverage of zone-2 journals in leptospirosis.

Subject	Frequency	%	Cumulative %
General Medicine	31	36.47	36.47
Microbiology	19	22.35	58.82
Pathology	15	17.65	76.47
Vetnary Science	11	12.94	89.41
Public Health	5	5.88	95.29
Nephrology	2	2.35	97.64
Epidemiology	1	1.18	98.82
Immunology	1	1.18	100
Total	85	100.00	

Table 6 shows that in zone-1 and 2 ; 36 frequently cited journals are general medicine titles, 23 in microbiology, 19 in pathology, 15 in Veterinary Science, 6 in public health, 4 in immunology, 2 each in epidemiology and nephrology.

Table 6. Subject-wise coverage of zone-1 and 2 journals in leptospirosis

Subject	Frequency	Percent	Cumulative percent
General medicine	36	33.64	33.64
Microbiology	23	21.50	55.14
Pathology	19	17.76	72.90
Vetnary science	15	14.02	86.92
Public health	6	5.60	92.52
Immunology	4	3.74	96.26
Epidemiology	2	1.87	98.13
Nephrology	2	1.87	100.00
Total	107	100.00	

The list of the core journals (Table-7) showed that the *Am J Trop Med Hyg, PLoS Negl Trop Dis, PLoS One* and *Vet Rec* are the highly cited journal as far as the Leptospirosis research concerned.

Table 7. Core journals in the field of leptospirosis

Name of the journal	No. of records	%	Rank
The American Journal of Tropical Medicine and Hygiene	200	3.97	1
PLoS Neglected Tropical Diseases	140	2.78	2
PLoS One	131	2.60	3
veterinary Record	101	2.01	4
Infection and Immunity	98	1.95	5
Indian Journal of Medical Microbiology	83	1.65	6
Emerging Infectious Diseases journal	82	1.63	7
Veterinary Microbiology	74	1.47	8
Epidemiology and Infection	71	1.41	9
Clinical and Vaccine Immunology	65	1.29	10
The Southeast Asian Journal of Tropical Medicine and Public Health	60	1.19	11
Annals of tropical medicine and Parasitology	59	1.17	12
Journal of Medical Microbiology	59	1.17	12
Tropical Animal Health and Production	58	1.15	13
Acta Tropica	57	1.13	14
Vaccine	56	1.11	15
Transactions of the Royal Society of Tropical Medicine and Hygiene	54	1.07	16

Name of the journal	No. of records	%	Rank	Name of the journal	No. of records	%	Rank
BMC Infectious Diseases	52	1.03	17	J Infect Dis	20	0.40	40
Journal of the American Veterinary Medical Association	50	0.99	18	J Med Assoc Thai	20	0.40	40
				J Postgrad Med	20	0.40	40
Comparative Immunology, Microbiology and Infectious Diseases	47	0.93	19	J S Afr Vet Assoc	20	0.40	40
				Jpn J Infect Dis	20	0.40	40
Journal of the Association of Physicians of India Assoc Physicians India	45	0.89	20	Eur J Clin Microbiol Infect Dis	19	0.38	41
				J Microbiol Methods	19	0.38	41
Rev Cubana Med Trop	43	0.85	21	Ann Agric Environ Med	18	0.36	42
Journal of Wildlife Diseases	42	0.83	22	Antimicrob Agents Chemother	18	0.36	42
Journal of the Brazilian Society of Tropical Medicine (JBSTM)	42	0.83	22	Lett Appl Microbiol	18	0.36	42
				Microbes Infect	18	0.36	42
Journal of Veterinary Internal Medicine	41	0.81	23	Microbiology	18	0.36	42
				Aust Vet J	17	0.34	43
BMC Microbiology	40	0.79	24	Bull Soc Pathol Exot	17	0.34	43
Vector-Borne and Zoonotic Diseases	40	0.79	24	Rev Chilena Infectol	17	0.34	43
International Journal of Infectious Diseases	37	0.74	25	Rev Salud Publica (Bogota)	17	0.34	43
				Biologicals	16	0.32	44
Journal of Infectious Diseases	37	0.74	25	BMJ Case Rep	16	0.32	44
Current Microbiology	36	0.72	26	Braz J Microbiol	16	0.32	44
Journal of Zoo and Wildlife Medicine	35	0.70	27	Int J Environ Res Public Health	16	0.32	44
N Z Vet J	35	0.70	27	J Indian Med Assoc	16	0.32	44
				N Z Med J	16	0.32	44
Preventive Veterinary Medicine	35	0.70	27	Nat Clin Pract Nephrol	16	0.32	44
Clinical Infectious Diseases	33	0.66	28	Rev Panam Salud Publica	16	0.32	44
Diagnostic Microbiology and Infectious Disease	33	0.66	28	J Infect Dev Ctries	15	0.30	45
Infection, Genetics and Evolution	33	0.66	28	Vet Pathol	15	0.30	45
Journal of Clinical Microbiology	31	0.62	29	Am J Med Sci	14	0.28	46
Microbial Pathogenesis	30	0.60	30	Asian Pac J Trop Biomed	14	0.28	46
Revista Argentina de Microbiología	30	0.60	30	Can J Microbiol	14	0.28	46
Tropical Doctor	29	0.58	31	FEMS Microbiol Lett	14	0.28	46
Brazilian Journal of Infectious Diseases	28	0.56	32	Hybridoma (Larchmt)	14	0.28	46
				J Biol Chem	14	0.28	46
Journal of Veterinary Medical Science	28	0.56	32	Mil Med	14	0.28	46
Zh Mikrobiol Epidemiol Immunobiol	27	0.54	33	Tijdschr Diergeneeskd	14	0.28	46
Zhonghua Liu Xing Bing Xue Za Zhi	26	0.52	34	Asian Pac J Trop Med	13	0.26	47
Clin Microbiol Infect	25	0.50	35	Dtsch Med Wochenschr	13	0.26	47
Scand J Infect Dis	25	0.50	35	Indian J Med Sci	13	0.26	47
Trop Med Int Health	24	0.48	36	Lancet	13	0.26	47
Indian J Med Res	23	0.46	37	Rev Inst Med Trop Sao Paulo	13	0.26	47
Mem Inst Oswaldo Cruz	23	0.46	37	Trop Biomed	13	0.26	47
Vet J	23	0.46	37	Zhejiang Da Xue Xue Bao Yi Xue Ban	13	0.26	47
Res Vet Sci	22	0.44	38	Am J Kidney Dis	12	0.24	48
Zoonoses Public Health	22	0.44	38	Cochrane Database Syst Rev	12	0.24	48
J Travel Med	21	0.42	39	Euro Surveill	12	0.24	48
J Vet Diagn Invest	21	0.42	39	Indian J Pathol Microbiol	12	0.24	48
Int J Syst Evol Microbiol	20	0.40	40	Lancet Infect Dis	12	0.24	48

Name of the journal	No. of records	%	Rank
Med Trop (Mars)	12	0.24	48
Nihon Rinsho	12	0.24	48
Przegl Epidemiol	12	0.24	48
Rev Med Interne	12	0.24	48
Ter Arkh	12	0.24	48
Theriogenology	12	0.24	48

8. CONCLUSION

The majority of the citations were journal articles (42.77 %). Among the core journals in zone-1 were titles devoted to topics in general medicine, microbiology, pathology, Veterinary Science, immunology, epidemiology and public health. There are 107 Journals in zone 1 and 2 which are the core journals in the field of Leptospirosis.

निष्कर्ष

पत्रिका लेखों में 42.77 प्रतिशत प्रशंसा लेख थे। पहले जोन की प्रमुख पत्रिकाओं में सामान्य चिकित्सा, सूक्ष्म जीव विज्ञान, विकृति विज्ञान, पशुचिकित्सा विज्ञान, प्रतिरक्षा विज्ञान, जानपादिक रोग महामारी विज्ञान और सार्वजनिक स्वास्थ्य विद्यायों के शीर्षक थे। लेप्टोस्पाइरोसिस के क्षेत्र की प्रमुख पत्रिकाओं में से पहले और दूसरे जोन में 107 पत्रिकाएं थी।

REFERENCES

1. Vijaya Kumar K.P. Applications of bibliometrics in libraries and information centres. *In*: G. Devarajan (ed.), Bibliometric Studies. 1997. ESS ESS Publications, New Delhi.

2. Morillo, Fernanda; Bordons, Maria and Gomez, Isabel. An approach to interdisciplinary through bibliometric indicators. *Scientometrics*, 2001, **51**(1), 203-222.

3. http://www.cindoc.csic.es/cybermetrics/links0.html/.

4. http://www.medterms.com/script/main/art.asp?articlekey=23870/.

5. Schloman, Barbara F. Mapping the literature of allied health: Project overview. *Bulletin of the Medical Library Association*, 1997, **85**(3), 271-277.

6. Hook, Sara Anne and Wagner, Crystal E. Mapping the literature of dental assisting. *Bulletin of the Medical Library Association*, 1999, **87**(3), 277-282.

7. Stevens, Sheryl R. Mapping the literature of cytotechnology. *Bulletin of the Medical Library Association*, 2000, **88**(2), 172-177.

8. Walcott, Barbara M. Mapping the literature of diagnostic medical sonography. *Bulletin of the Medical Library Association*, 1999, **87**(3), 287-291.

9. Smith, Aida Marissa. Mapping the literature of dietetics. *Bulletin of the Medical Library Association*, 1999, **87**(3), 292-296.

10. Haaland, Ardis. Mapping the literature of dental hygiene. *Bulletin of the Medical Library Association*, 1999, **87**(3), 283-286.

11. Burnham, Judy F. Mapping the literature of respiratory therapy. *Bulletin of the Medical Library Association*, 1999, **87**(3), 293-296.

12. Slater, Linda G. Mapping the literature of speech-language pathology. *Bulletin of the Medical Library Association*, 1999, **87**(3), 297-302.

13. Wakiji, Eileen M. Mapping the literature of physical therapy. *Bulletin of the Medical Library Association*, 1997, **85**(3), 284-88.

14. Burnham, Judy F. Mapping the literature of radiologic technology. *Bulletin of the Medical Library Association*, 1997, **85**(3), 289-292.

15. Reed, Kathlyn L. Mapping the literature of occupational therapy. *Bulletin of the Medical Library Association*, 1999, **87**(3), 298-304.

16. Hall, Ellen F. Mapping the literature of perfusion. *Bulletin of the Medical Library Association*, 1999, **87**(3), 305-311.

17. Delwiche, Frances A. Mapping the literature of clinical laboratory science. *Journal of the Medical Library Association*, 2003, **91**(3), 303-310.

18. Ramakrishnan, J. and Rajendran, P. Mapping the literature of hepatitis B. *In:* Information and knowledge Management in Health Sciences: Newer Perspectives, MLAI 2004, National Convention. 2004. Dr. ALM Post Graduate Institute of Basic Medical Sciences, University of Madras, Chennai, pp. 216-224.

19. Krishnamoorthy, G., Ramakrishnan, J. and Devi, S. Bibliometric analysis of literature on diabetes (1995-2004). *Annals of Library and Information Studies*, 2009, **54**(September), 150-155.

20. Ramesh Babu, B. and Ramakrishnan, J. Indian contributions to the field of HIV/AIDS (1997-2006): A scientometric study. *In*: Webometrics, Infometrics and Scientometrics: Measuring Sceintific and Technological Progress of India. Ed by S.L. Sangam *et al*. 2010, Karnatak University, Dharwad, pp. 164-178.

21. Ramakrishnan, J. and Thavamani, K. Bibliometric analysis of the literature of hepatitis C. *In*: Role of Medical Libraries in Global Health Initiatives, MLAI 2012. National Convention, 2012. North Eastern Indira Gandhi Regional Institute of Health and Medical Sciences, Shilong.

22. Bradford, S.C. Documentation. 1948. Crosby, Lockwood, London.

भारतीय जर्नल फार्मास्युटिकल शिक्षा एवं अनुसंधान का बिब्लोमेट्रिक विश्लेषण 2010–2012
Bibliometric Analysis of Indian Journal of Pharmaceutical Education & Research (2010-2012)

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सारांश

औषधि शिक्षा एवं अनुसंधान Pharmaceutical Education–Research का भारतीय जर्नल पर बिब्लोमेट्रिक विश्लेषण 2010–2012 दर्शाता है कि योगदान में वृद्धि की एक प्रवृति और योगदान में औसत संख्या 22 प्रति संस्करण थी। अधिकांश लेखकों ने सहयोगात्मक तरीक से काम करना पसन्द किया और संयुक्त रूप में इस लेख में योगदान किया है। योगदान की संस्थागत और भौगोलिक वितरण की गणना की गयी। सबसे अधिक योगदान महाराष्ट्र से थे, बाद में कर्नाटक से किये गये और विदेशी लेखकों ने भी 23 लेखों में अपना योग दिया। पत्रिकाओं के 12 विषयों में प्रकाशित 168 लेख 3777 विश्लेषण प्रशंसा पत्र के साथ संलग्न हैं। अधिकांश लेखों को बड़ी संख्या में 80.96 प्रतिशत पत्रिकाओं में उल्लेख किया गया है जबकि किताबों के दूसरी प्रति 11.97 प्रतिशत संस्करणों के साथ आ चुकी है। वर्ष 2012 में पत्रिका का प्रभाव कारण 0.150 है।

ABSTRACT

Bibliometric analysis on Indian Journal of Pharmaceutical Education & Research (2010-2012) showed a trend of growth in contributions and the average number of contributions was 22 per volumes. Majority of the authors preferred to do collaborative work and contributed this paper jointly. The institutional and geographical distribution of contributions was calculated. Most of the contributions were from Maharashtra followed by Karnataka and also foreign authors contributed 23 papers. Analysis 3777 citations appended to 168 papers published in 12 issues of the journals. Majority of the papers cited journals in large numbers (80.96 %), while books come on second with (11.97 %) citations. The impact factor of the journal is 0.150 in 2012.

Keywords: Bibliometric, citation analysis, indian journal of pharmaceutical education & research

1. INTRODUCTION

The term bibliometrics was first used by Alan Pritchard in 1969 stresses the method of undertaking the counting of books, articles, publications, citations, etc., and in general any statistical significant manifestation of recorded information regardless of disciplinary bounds. Bibliometric studies can be applied to any discipline to find out trends and growth of the literature and to portray the quality, maturity and productivity of the journal[1]. Bibliometrics studies are now being used for a verity of purposes like determination of various scientific indicators, evaluation of scientific output, selection of journals for the libraries, forecasting the research potential of a particular field and so on[2].

1.1 Source Journal

Indian Journal of Pharmaceutical Education & Research (IJPER) is the official Publication of the Association of Pharmaceutical Teachers of India (APTI). It is a quarterly journal that publishers the original research work of authors, review articles and short communication. It also publishs notes, book reviews, reports of seminars and conferences, synopsis of doctoral thesis, continuing pharmaceutical education, invited editorial, institutional news, APTI news, etc.[6]

1.2 Objectives

The main objectives of the study were to:
1. Know year-wise distribution and average number of contributions per volume

2. Study the authorship pattern
3. Determine the geographical distribution of contribution in the journal
4. Calculate the number of citations per article, and
5. Prepare bibliographical distribution of cited journals in IJPER

1.3 Scope and Limitations

The study covers 168 articles published in the year 2010-2012 of IJPER. These research articles included 3,777 cited items, i.e., citations. The Study indicated, on an average, a research article included about 22 citations.

2. METHODOLOGY

A total 12 issues of IJPER (2010-2012) have been taken for the study. The details regarding each published article such as title of the article, number of authors, their institutional affiliations and address, number of references with list, etc. were recorded and analyzed for making observations. Tables are filled by tally mark system counting one by one reference and other data. The data has been calculated and represented in tables. The study does not take consideration how far a certain piece of information is useful or a particular citation relevant to the central theme of the citing documents. The data was subjected to the analysis as per the objectives of the study[7].

Table 1 gives the year-wise distribution of articles in the journal. Among 168 contributions, the majority of contributions (34. 52 %) were contributed in 2011 and 2012, next in the year 2010 (30.96 %).

Table 2 shows that the trends in authorship pattern, such as multi-authored papers, are lead in frequency of occurrence in IJPER throughout the study and, more interestingly, this growth is continuous which indicates about the future pattern in authorship. In multi authored contributions, two authored and three authored articles are maximum, compared with four authored or more than four authored articles.

Table 3 shows that international contributions in the journals merely 23 contributions of out of 61 contributors, while contributions from India constituted 86.31 %, having 145 contributions out 168. This shows that the coverage of IJPER is very broad and its scope is confined to the India and abroad.

Table 1. Volume-wise distribution of contributions

Year	Vol. No.	No. of issues	No. of contributions	Percentage
2010	44	4	52	30.96
2011	45	4	58	34.52
2012	46	4	58	34.52
Total		**12**	**168**	**100**

Table 3. Geographical distribution (country-wise)

Name of the country	No. of contribution	%
India	145	86.31
Bangladesh	3	1.79
Ethiopia	3	1.79
Uganda	2	1.19
Serbia	2	1.19
Oman	2	1.19
UAE	2	1.19
Thailand	1	0.60
Malaysia	1	0.60
South Africa	1	0.60
Pakistan	1	0.60
Bangkok	1	0.60
Ireland	1	0.60
Turkey	1	0.60
Saudi Arabia	1	0.60
China	1	0.60
Total	168	100

The distribution of publications with given in Table 4. During analysis is it observed that most of the articles are contributed by Indian authors. The number of Indian contributors is 145 and the percentage is 86.31 %, while foreign contributors are 13.69 %. As maximum contributors are from India it is found that Maharashtra contributed the highest number of articles (35, 20.83 %) followed by Karnataka (31 18.45 %). A.P contributed 11 articles with 6.57 % and occupied third position.

Table 5 shows the number of citations, total number of citations, and average number of citations per article as well as per issues. A total of 3777 citations are distributed among 12 journal issues having 168 articles. It is observed that the year 2011 has the highest number of citations per article.

The bibliographical forms of citations are divided into broad categories that include journals, books, proceedings, theses electronic media (web) and others sources like WHO bulletin handbooks gazettes, abstracts, news papers, workshop manuals, etc. Table 6

Table 2. Authorship pattern of contributions

Year	Number of authors contributed					Total
	Single (%)	Two (%)	Three (%)	Four (%)	>Four (%)	
2010	3 (42.85)	9 (39.13)	16 (35.55)	12 (27.91)	12 (24)	52
2011	3 (42.85)	5 (21.74)	15 (33.33)	14 (32.56)	2 1 (42)	58
2012	1 (14.30)	9 (39.13)	14 (31.12)	17 (39.53)	1 7 (34)	58
Total	7	23	45	43	50	168

shows that journals are cited predominantly in all the years followed by books. Journals occupied 80.96 % citations which were 3058 out of a total 3777 citations. Books were 150 (11.97 %).

Table 4. Geographical distribution of contributors (India state-wise)

Name of the state	No. of contributors	%	No. of contributions	%
Maharashtra	135	22.24	35	20.83
Karnataka	107	17.63	31	18.45
UP	27	4.49	10	5.95
Tamilnadu	48	7.91	10	5.95
A.P.	52	8.57	11	6.57
Rajasthan	20	3.29	7	4.17
Gujarat	27	4.49	4	2.38
West Bengal	32	5.27	7	4.17
Himachal Pradesh	17	2.80	6	3.57
Uttarakand	8	1.32	4	2.38
Orissa	30	4.94	7	4.17
Assam	3	0.49	1	0.60
New Delhi	7	1.15	4	2.38
M.P.	13	2.14	3	1.79
Jharkhand	3	0.49	1	0.60
Sikkim	5	0.82	1	0.60
Punjab	3	0.49	1	0.60
Haryana	3	0.49	1	0.60
Kerala	6	0.99	1	0.60
Foreign	61	10.05	23	13.69
Total	**607**		**168**	

Table 5. Citation pattern

Year	No. of articles	No. of citations	Average citations per article	Average citations per journal issue
2010	52	942	18.12	235.50
2011	58	1615	27.84	403.75
2012	58	1220	21.03	305.00
Total	168	3777		

3. RESULTS AND FINDINGS

The following results and conclusion can be drawn from the bibliometric analysis of the Journal, *Indian Journal of Pharmaceutical Education & Research* (2010-2012):

1. This study showed a trend of growth in contributions published during 2010-2012 and average number of contributions per volume is 22.
2. Majority of the pharmaceutical authors prefer to contribute their papers jointly.
3. Most of the contributions in these journals are from India (86.31 %). Only 23 contributions (13.69 %) were from abroad.
4. Maharashtra and Karnataka are the biggest domestic contributors to the articles published in this journal.
5. Most of the contributions are with citations. The year 2011 has the highest number of citations per article.
6. Majority of the article have cited journals in large numbers (80.96 %) while books come on second with (11.97 %) out of total citations.

4. CONCLUSION

Pharmaceutical educations in India have concentrated on conducting research work at doctoral level in order to develop a knowledge base for the profession. The result of this type of citations would appear to be of great potential value in the management of library journal collections. Measures of citation frequency and impact factor should be helpful in determining the optimum make-up of both special and general collection.

निष्कर्ष

भारत में औषधि फार्मास्युटिकल शिक्षा के पेशे के लिए ज्ञान के आधार को विकसित करने के क्रम में डायरेक्ट्रेट स्तर पर अनुसंधान कार्य के संचालन पर ध्यान केन्द्रित किया गया है। पुस्तकाय जर्नल संग्रह के प्रबंधन में इस प्रकार के प्रशंसा पत्र के परिणामों में काफी संभावित मूल्य प्रकट हुये हैं। प्रशस्ति पत्र आवृति और प्रभाव कारक विशेष और सामान्य दोनों प्रकार के संग्रहों का इष्टतम रूप बदलने में सहायक होने चाहिए।

Table 6. Bibliographical distribution of citations

Year	Journals (%)	Books (%)	Proceedings (%)	Theses (%)	Web (%)	Others (%)	Total
2010	726 (23.74)	121 (26.77)	35 (56.45)	20 (26.32)	26 (33.33)	14 (27.45)	942
2011	1297 (42.41)	198 (43.81)	15 (24.19)	48 (63.16)	30 (38.46)	27 (52.94)	1615
2012	1035 (33.85)	133 (29.42)	12 (19.36)	8 (10.52)	22 (28.21)	10 (19.61)	1220
Total	3058	452	62	76	78	51	3777

REFERENCES

2. Kwattra P.S. Tex book of information science, APH Publishing Corp, Delhi, 2000, 41.

2. Raut, T.K.; Sahu, S.B. & Ganguly, S. *Strategic Management Journal*: A citation study, *Annals of Library and Information Studies*, 2008, **55**(3), 69-75.

3. Garg, K.C.; Sharma, P. & Kumar, S. Scientometric profile of the journal 'Mausam'. *Annals of Library and Information Studies*, 2008, **55**(3), 76-80.

4. Datta, B.; Das, A.K. & Sen, B.K. A comparative study of citations patterns among 8 scholarly journals published by NISCAIR. *Annals of Library and Information Studies*, 2002, **49**(4), 127-134.

5. Hadimani, M.B. & Rajgoli, I.U. Applied Engineering in Agriculture: A five year (2004-2008) citation study. *Annals of Library and Information Studies*, 2010, 57(6), 140-145.

6. Kulkarni, A.P.; Balaji, Poshett & Narwade, G.R, *Indian Journal of Pharmaceutical Education and Research* (1996-2006): A bibliometric analysis. *Annals of Library and Information Studies*, 2009, **56**(12), 242-248.

7. Khan, K.M; Pooja R. & Rao, Anantha K.R. Bibliometric Analysis of *Indian Journal of Dental Research* (2002-2004). *Indian Journal of Library and Information Science*, 2012, **6**(3), 239-245.

8. Doraswamy, M. & Janakiramaiah, M. Information use pattern of library and information science professionals: A bibliometric study of conference proceedings. *International Journal of Digital Library Services*, 2013, **11**(1), 33-44.

भारतीय प्रबंधन साहित्य : एक सूचनात्मक अध्ययन
Management Literature from India: An Informetric Study

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सारांश

25 सालों की अवधि के माध्यम से भारतीय प्रबंधन की विकास दर प्रस्तावित की है। परिवर्तनीय अर्थात, सिंगल, डबल और बहु–साहित्यकायों को चुना गया है जबकि अनुशासन की प्रगति वापस अनुरेखण हो रही है। उददेच्य अर्थात, भारतीय प्रबंधन साहित्य प्रवृति का वापस अनुरेखण, प्रमुख क्षेत्रों की पहचान करना, विद्वानों के योगदानों का पता लगाना और बाकी दुनिया के साथ भारत की संदर्भात्मक तुलना करना। इसका प्रयोजन अपने संग्रहों का विकास करते हुए शीर्ष उत्पादन ⁄ श्रेणी क्रम में पत्रिकाओं की सूची को विकसित करने में नीति निर्माताओं की सहायता करना है। कार्य प्रणाली प्रणाली विज्ञान में मुख्य रूप से निपक्ष रूप में एकत्रित किये गये आंकड़ों का क्यिलेद्घाण करने के लिए विभिन्न ग्रंथसूची मापदंडों का मात्रात्मक विश्लेषण भी शामिल किया गया है। केवल 25 सालों की अवधि तक फैले हुए भारतीय प्रंबंधन अध्ययनों के साहित्यों को शामिल किया गया है। वैश्विक प्रबंधन साहित्य के साथ भारतीय प्रबंधन साहित्य की तुलना करने के प्रयास भी किये गये है। खिसकी हुई सीमाओं की भी पहचान की गयी हैं। वर्तमान संदर्भ में प्रबंधन निश्चित रूप से सबसे गतिशील विषयों में से एक है। इन सभी निष्कर्षों को ध्यान में रखते हुए कुछ सुझावों को आगे भेजा गया है।

ABSTRACT

The growth of the Indian management literature through a span of twenty five years is projected. Variables, viz., single, double, and multiple authorship are chosen while tracing back the discipline's progress. Objectives, viz., tracing back Indian management literatures' trend; identifying the core areas, finding out the contributions of the scholars, and making a bibliometric comparison of India with the rest of the world were aimed. Purpose is to assist the policy makers in developing the list of top productive/ ranking journals while developing their collections. Methodology included quantitative analysis of various bibliographic parameters to analyze the collected data objectively. The literatures from India on management studies spread over a period of 25 years only have been covered. Attempt is also made to compare the Indian management literature with global management literature. Limitations crept in were also identified. In present day context management is certainly one of the most dynamic disciplines. Keeping all the findings in view a few suggestions have also been put forwarded.

Keywords: Management study, informertic study, bibliometric analysis, authorship pattern, hypothesis testing, journal ranking, literature growth

1. INTRODUCTION

Management is the coordination of human and non-human resources towards the accomplishment of organisational goal. When machines and human beings began moving progressively in unison to greater levels of specialization, management was necessary to coordinate diverse tasks and operations. In this information era, managers have to have not only the interpersonal skills but also the knowledge about computers and information management. Gradually, the management thinkers' attention phase shifted from production, profit, and growth to quality, services,

benefits to stakeholders and continuity in maintaining well-being of the organization. Management is the field of a multi- as well as inter-disciplinary nature of applied social sciences.

Moreover, management theories may not be applicable universally. Management practices may also differ from place to place, culture to culture, organization to organization. It is generally acknowledged, that from the ancient through the middle ages there were unique and important management approaches in the areas of public administration, military activities and religious institutions. But nothing parallel to the

modern management did exist and hence no question of management, as the word implies. It is quite difficult to establish or put forward a correct and comprehenshive definition of the word"management". There exist hundreds of definitions put forwarded by our management "gurus" as well as pioneers in this field. Observations on only a few of them may only be made. Webster's Third New International Dictionary defines it as "The act or art of managing"[1]. According to Henry Fayol, management is "to manage is to forecast, and plan, to organise, to command, to co-ordinate, and to control"[2] . Management can usually be viewed as a network of interrelated functional responsibilities. It is an attainment of pre-established goals by the direction of human performance along pre-established lines. It can be viewed as an integration and utilization of resources such as land, labour and capital to achieve the desired objectives. It has distinct process consisting of functions like planning, organizing, staffing, directing and controlling. When used in the noun form, the term refers to the people responsible for directing and running an organization. It has been observed, that though management is an age old idea; its implementations on civilization is a most recent phenomenon. From 80's it becomes a full-fledged distilled discipline as is revealed through various documents and its different literary warrants. In the present study it had been observed that during 1980 to 2005, more and more management schools came up across the country. Actually, the sole-asking point of the present study is to project growth through the management literature from India. That is why the variables like single authorship, double authorship, and multiple authorship have been opted for ascertaining the continuous progress of the discipline. Like other social sciences, in management also, the authors, as the records showed, are quite reliable to contribute independently in peer reviewed referred journals globally.

With the above background, the present study on management literature for Indian perspective has been taken up to find out the trends in research during the initial 25 years since its inception in 1980s. Naturally the answer to some questions, came up in mind during the time of research, are incorporated in this work with the help of informetric analysis.

1.2 Objectives of the Study
The main objectives of the study are:
1) to find out the trends of management literatures from India during the first twenty five years,
2) to identify the core subject areas based on management literature and to find out the contributions of the scholars,
3) to make a bibliometric comparison between India and the world in the context of management literature.

1.3 Purpose of the Study
Main purposes of the study are:
* to provide the policy makers with the list of top productive/ ranking journals and assisting in their collections development. Library managers may also propose, continue or discontinue the journal titles on different subfields.
* researchers in management sciences may find it helpful in identifying the topics or areas of research.
* researchers in management sciences may also select the channels (journals) judiciously for releasing their outputs.
* within the purview of the syllabus, current research trends may be encouraging towards the teachers to adapt the revealed situation for improvising the students'field/project works.
* commercial publishers may also find it helpful in decision making for launching new journals in management.

2. METHODOLOGY
Methodology adopted for the present study was mainly the quantitative analysis of different bibliographic parameters, i.e., bibliometrics analysis with selective mathematical and statistical techniques to analyze the collected data objectively.

2.1 Scope and Coverage
Methodological improvements and refinements lead the bibliometric/informetric studies to the reliability and success. Literature of different journals published from India and abroad covering management literatures have only been scanned in this study. Thoughts of the Indian management gurus and their scholarly output has also been taken into consideration in this study.

2.2 Coverage
A period of 25 years from 1981-2005 has been taken to find out the trend in management literature in India. Due to the multi-disciplinary nature, the management literatures is scattered in various journals. Relevant data from different sources like Scopus, Econlit, ABI/INFORM, GIPL and a few primary journals not covered by the preceeding sevices have also been checked directly. More specifically, it may be mentioned that there is no comprehenshive secondary services for Indian management. Besides most of the Indian management journals are not covered by ABI/INFORM which is the full fulltext management database. So, the data for the present study was also collected from different sources and a period of quarter century been taken for the present study.

2.3 Methods Used

For the purpose of the study the available sources / database have been searched exhaustively. Management being a multi-disciplinary subject, the data are scattered over various databases. Thus data had been collected from various primary and secondary sources. ABI/ INFORM is the sole fulltext management database covering most of the management journals. Data had also been collected and consolidated from Econ Lit (OCLC), Guide to Indian Periodicals Literature (GIPL), Google Scholar, SCOPUS and JSTOR database through normal count method.

The search query was designed with the help of two key terms i.e. "India" and "management" along with some variables like author, affiliation of the author, title of the articles, sources of publication, year of publications, pagination, abstracts, references, online availability of the source articles and the broad subjects. Information thus collected had been posted in excel sheet for further updation and modifications and the same had been analysed later with the help of some statistical softwares. SPSS (IBM) and Excel (Microsoft) had been used for analysing a total of 6038 records which were the basic source data collected through searching of journal articles. It had been noticed that all the management journals had never been covered by a single database. Most of the Indian management journals were not covered by ABI/INFORM (Global), though it had covered more than a total of 5000 journals from different languages. That is why the data had been collected from GIPL.

Primary and secondary sources of documents as well as the wiki-pedia had been scanned to trace back the major developments in this field. The outcome is presented herewith; side by side major Indian developments had also been listed.

3. OBSERVATIONS

3.1 Data Analysis

Data analysis is the process of turning data into information. Quantitative evaluation always encompasses systematic analysis and logical interpretation of processed data.

From Table 1 it is revealed that a total of 6038 records had been collected and analysed from various sources as mentioned earlier. As the study is termed

Table 1. Authorship pattern

No. of Authors	Frequency	Percentage (%)
Single author	4665	77.39
Joint author	1109	18.40
More than two authors	264	4.38
Total	6038	100

informetric study, where data collected from different sources and their measurement is feasible with the assistance of precision based application software like Spreadsheets. Of late, in social sciences all the survey based research is usually done with the utilisation of some statistical tools. So, in this study SPSS-IBM (ver. 18) and Microsoft Excel have been used to analyse the entire tabular data as well as to present them in graphical form. The main thrust areas are authorship pattern, authors' contributions on allied subjects, subject clustering, top productive journals, high productive authors, growth of subject during 1981-2005 under 10 broad subjects have been identified with the help of Dewey Decimal Classification (DDC), 22nd edition.

The characteristics of any subject literature include not only the basic publishing patterns but also that of the authors themselves. Thus the authorship were also analysed to determine the percentage of single, double (joint) and more than two authors. It is to be noted here that the authorship pattern has been obtained by analyzing the journal articles only. From the Table 1, it has been found that number of single authored articles are 4665 (77.39%) which occupied the highest position, joint authored articles are 1109 (18.40%) and articles contributed by more than two authors are 264 (4.38%).

Management is an age old concept but its implementation on civilization is quite recent. From 80's it has become a full fledged distilled discipline as seen through different literary warrant. In this study it had been seen that during 1981 to 2005, more and more management schools are initiated across the country. Actually, the sole asking point of the present study is to show its growth over the management literature in India. That is why the variables like single authorship, double authorship and multiple authorship had been selected for analyzing the continuous progress of the discipline. Like other social sciences, in management also, the authors are self reliable to contribute independently in peer reviewed referred journals globally. It revealed that authors' affinity to the management science was fully acknowledged due to its dynamism, prospects and its prosperity.

In Table 2, the subject "Management Science" has been sub-grouped into 10 allied subjects as per DDC 22nd edition. It is noticed that out of 6038 entries "Marketing Management" had scored the highest count of articles 1711 (28.34%); HRM scored 1360 (22.52%) articles; Financial Management contained 1085 (17.97%) articles; Integrated Management was having 829 (13.73%) articles; Entrepreneurial Management was scoring 453 (7.50%) articles; Quality Management scored 236 (3.91%) articles ; Strategic Management got 195 (3.23%) articles; Information Management

Table 2. Distribution of subjects

Subject	Frequency	% of Subject distribution
Entrepreneurial Management	453	7.50
Public Utility Management	10	0.17
Financial Management	1085	17.97
Integrated Management	829	13.73
Human Resource Management	1360	22.52
Information Management	93	1.54
Marketing Management	1711	28.34
Quality Management	236	3.91
Welfare Management	66	1.09
Strategic Management	195	3.23
Total	6038	100

scored 93 (1.60%) articles; Welfare Management got 66(1.09%) articles and Public Utility Management scored only 10(0.17%) articles. It may be concluded that main thrust area was on Marketing Management and the areas of management as found from record were growing equally in unison with other social sciences. It is revealed that this subject had been growing rapidly as well as its literary works are also increasing.

In Table 3 A1, distributions of different subject areas spread over a 5 years span have been shown. This table depicts the growth of allied subjects during the five year span.

During 1981-1985, it has been observed that a maximum number of articles were produced. Out of which "Marketing Management" scored the highest number of articles e.g. 504(28%) followed by HRM scored 453 articles (26%) and Public Utility Management

showing the least number of articles (almost 0%).

During 1986-1990, a total of 924 articles could be traced out, of which Marketing Management leading with highest number of articles 265 (29%), followed by HRM featuring 246 (26%) articles and Public Utility Management with only 2 articles (almost 0%).

During 1991-1995, 721 articles could have been found out of which Financial Management lead with the highest articles 180 (25%) followed by Marketing Management having 163(22%) articles and HRM scoring 153 (21%) articles. In comparison with the above two block years i.e. 1981-85 and 1986-1990 its growth has became moderately low.

During 1996-2000 there were 1211 articles in total, out of which Marketing Management occupied the highest position with number of articles 327 (27%), followed by HRM with a score of 266(22%) and Financial Management having 184(18%) articles.

In the last block year i.e. 2001-2005 there are 1396 articles in total, out of which it is evident from Table 3A.1 that Marketing Management scored highest number of articles, 452(33%). In this block HRM with 242 (18%) articles and Public Utility Management having least number of articles(almost 0%) comes afterwards.

From Table 3A.1, it is evident that out of the five blocks of five years of the present study, Marketing Management occupying the top position as far as the articles are concerned and played a pivotal role. From the preceeding tables it has been observed that the subject "marketing management" is growing rapidly. So, it can be inferred that during this period "marketing management" was the thrust area of the research in Management Science.

Table 3 A.2 reveals the growth of subjects in a five year span along with authorship pattern. So, it

Table 3 A.1 Growth of allied subjects

Subjects	Year					Total
	1981-1985	1986-1990	1991-1995	1996-2000	2001-2005	
Entrepreneurial Management	105	53	55	115	128	456
Public Utility Management	2	2	2	3	2	11
Financial Management	355	161	180	184	202	1082
Integrated Management	255	117	94	181	181	828
Human Resource Management	453	246	153	266	242	1360
Knowledge Management	18	8	5	16	46	93
Marketing Management	504	265	163	327	452	1711
Quality Management	21	23	42	75	75	236
Welfare Management	33	15	5	6	7	66
Strategic Management	40	34	22	38	61	195
Total	1786	924	721	1211	1396	6038

Table 3A.2. Subject Distribution and Authorship Pattern

Subjects	Authorship	1981-1985	1986-1990	1991-1995	1996-2000	2001-2005	Total
Entrepreneurial Management	Single Author	92	43	41	92	66	334
	2 Authors	13	9	12	21	45	100
	>2 Authors	0	1	2	2	17	22
Public Utility Management	Single Author	1	0	1	3	2	7
	2 Authors	1	2	1	0	0	4
	>2 Authors	2	2	2	3	2	11
Financial Management	Single Author	312	136	156	159	139	902
	2 Authors	38	23	24	22	48	155
	>2 Authors	5	2	0	3	15	25
Integrated Management	Single Author	220	105	78	150	106	659
	2 Authors	32	11	14	25	52	134
	>2 Authors	3	1	2	6	23	35
Human Resource Management	Single Author	389	199	113	208	164	1073
	2 Authors	54	42	35	50	67	248
	>2 Authors	10	5	5	8	11	39
Knowledge Management	Single Author	16	7	3	14	30	70
	2 Authors	2	1	2	2	11	18
	>2 Authors	0	0	0	0	5	5
Marketing Management	Single Author	435	214	121	227	260	1257
	2 Authors	63	44	35	81	143	366
	>2 Authors	6	7	7	19	49	88
Quality Management	Single Author	18	22	32	54	30	156
	2 Authors	3	1	8	15	33	60
	>2 Authors	0	0	2	6	12	20
Welfare Management	Single Author	30	13	5	4	6	58
	2 Authors	3	2	0	1	1	7
	>2 Authors	0	0	0	1	0	1
Strategic Management	Single Author	34	28	14	34	41	151
	2 Authors	5	6	5	4	17	37
	>2 Authors	1	0	0	0	3	4
	Total	1788	926	720	1214	1398	6038

may be established that authors in management were self dependent in contributing any paper or carrying out the research in various Indian and foreign journals.

3.2 Ascertaining Core Journal

In every subject there exists set of journals, which are usually referred frequently by the researchers for their close affinity to the subject coverage of the respective journals as well as the areas of research work. These highly cited journals may be considered as the 'core journals' on respective subject domains.

From Table 4, it is observed that out of a total of 513 journals 20 top productive journals have been segregated. Management Accountant have scored highest number of articles i.e 1248 (20.67%), followed by Indian Management with 930 (15.40%), Decision with 398 (6.59%), Management and Labor Studies with 260 (4.21%) and Chartered Accountant with 208 (3.44%) articles respectively. These 20 highly ranked journals have produced a total of 4251 (70.4%) articles and the remaining 493 journals have produced 1932 (29.6%) articles.

It is also clear from Figure 4 that due to the enormous growth in the field of knowledge the number of publications has also escalated. Due to the paucity

of funds most of the libraries were compelled to restrict their subscriptions to periodicals. That is why the funds should be allocated rationally. These high ranking journals when cumulated have produced more than 70% of the total articles, help the library management in deciding on their acquisition policy. So, they may primaliy go for these high ranking journals, if fund permits then they can go for more titles from the moderately productive journals to cater to support their clients' research activities.

From Table 5, it is evident that there are 10 highly productive authors. Subrata Chakraborty scored the highest 51(0.8%) articles followed by T.A. Mathais who was having 27 (0.4%) articles, S.K. Bhatia 25(0.4%) articles, Siddhartha Ganguly 23(0.4%) articles, Narendra K. Sethi, S.C. Seth and Sharu S. Rangasekhar with same number of articles 22 each (0.3%), Gouranga P. Chattopadhyay with 20 (0.3%) articles, P.N. Rastogi,with 17 (0.3%) articles and Vipul with 16 (0.3%) articles. It may be noted that most of these highly productive authors were from IIMs i.e. from the premier management schools of India.

3.2 Indian Contribution vs. Global Contribution: A comparision

Table 4. High productive journals

Name of the journal	No. of articles	Percentage (%)	Cumulative Frequency	Cumulative % of Frequency
Management Accountant	1248	20.67	1248	20.67
Indian Management	930	15.40	2178	36.07
Decision	398	6.59	2576	42.66
Management and Labor Studies	260	4.31	2836	46.97
Chartered Accountant	208	3.44	3044	50.41
Vikalpa	131	2.17	3175	52.58
ASCI Journal of Management	124	2.05	3299	54.64
Management in Government	113	1.87	3412	56.51
Indian Journal of Public Administration	111	1.84	3523	58.35
SEDME Journal	108	1.79	3631	60.14
Indian Journal of Industrial Relations	103	1.71	3734	61.84
Economic and Political Weekly	90	1.49	3824	63.33
Abhigyan	79	1.31	3903	64.64
Productivity	52	0.86	3955	65.50
Indian Journal of Training and Development	52	0.86	4007	66.36
Personnel Today	52	0.86	4059	67.22
Administrative Change	50	0.83	4109	68.05
Administrator	49	0.81	4158	68.86
Man and Development	47	0.78	4205	69.64
Excellence in Supervision	46	0.76	4251	70.40
In rest of the journals (493)	1787	29.60	6038	100.00
Total	6038	100.00		

The concept of management developed in West as a result of evolutionary process is based on the changing values systems of the people - the social, political, and economic environment as well as educational and cultural milieu. However, in India, historically people have never evolved their own concepts, keeping in view the Indian scenario. They found it convenient to transfer management technology, a trusted scientific technology. As a result of this grafting process of management, they have created more confusion in management thinking.However, suddenly due to the success of the Japanese methods of management, the western countries have even began doubting on

Table 5. High productive authors

Author	Frequency	Affiliation
Chakraborty, Subrata	51	Indian Institute of management, Lucknow
Mathais, T A	27	XLRI, Jamshedpur
Bhatia, S K	25	BHEL, Bhopal
Ganguly, Siddhartha	23	Indian Institute of management,Calcutta
Rangasekhar, Sharu S	22	Grama Vidiyal Micro Finance Ltd., Trichi
Seth, S C	22	Dept. of Business Management and Economics (Dr. B. R. Ambedkar University, Lucknow)
Sethi, Narendra K	22	S S Nath & Company (Meena Bazaar)
Chattopadhyay, Gouranga P	20	Indian Institute of Management,Calcutta
Rastogi, P N	17	Indian Institute of Management, Lucknow
Vipul	16	Indian Institute of Management, Lucknow

their own concepts and were trying to emulate the Japanese lessons. This has further aggreviated the confusion on the Indian managers as well as the management experts, who athrough were following as a gospel truth whatever the westerners had proposed. Research findings in Indian Management indicated that many of the Management practices suggested by foreigners specially the Western consultants, when implemented in Indian Organizations, get rejected by the environment resulting in contradiction in the Indian context between stated policies and actual practices usually termed as "Dualism" in Indian Management. Many of these practices remained on paper without proper implementation. Therefore, it became imperative to evolve their own concepts of Management, which were in perfect tune with Indian environment and value systems. They have evolved and arrived at such concepts and Management practices based on extensive

research which were acceptable in Indian context[3].

In Table 6, an attempt has been made to compare the Indian management literature with global one. Year-wise data has been shown with percentage, where it depicts those Indian contributions were moderately low.

So, it can be inferred that Indian authors in respect of management sciences more and more concentration should be given on publishing their research out put in foreign journals. The study indicated that India has a great potential in initiating and sustaining still higher publication growth in management sciences during coming years as compared to other countries.

3.3 Testing of Bradford's Law of Scattering

To determine the most relevant journal titles in the field of study and to identify the preferred medium by the researchers, help from the law of scattering is sought. S. C. Bradford in 1985 in his study analysed a four-year bibliography of references to articles on Applied Geophysics. He listed the journals containing references to that field in decreasing order of productivity and then divided the list into three "zones" each containing roughly the same number of references. He observed

Table 6. Indian contributions vs. global contributions

Year	Indian	Global	% of Indian Contributions
1981	568	3433	16.55
1982	329	3705	8.88
1983	342	4078	8.39
1984	278	4315	6.44
1985	250	4634	5.39
1986	193	4614	4.18
1987	207	5619	3.68
1988	165	5840	2.83
1989	203	6114	3.32
1990	156	6495	2.40
1991	145	7687	1.89
1992	160	10026	1.60
1993	105	11838	0.89
1994	134	12047	1.11
1995	177	13035	1.36
1996	232	10443	2.22
1997	156	10128	1.54
1998	307	10824	2.84
1999	213	10833	1.97
2000	303	10940	2.77
2001	251	11594	2.16
2002	265	13284	1.99
2003	371	14347	2.59
2004	229	13806	1.66
2005	280	16349	1.71

that the number of journals contributing references to each zone increased by a multiplication of about five. On the basis of these observations, he concluded that the ratio of the titles of journals in successive zones follow a common pattern, and thus proposed the "law of scattering" as "if scientific journals are arranged in order of decreasing productivity of articles on a given subject, they may be divided into a nucleus of periodicals more particularly devoted to the subject and several other groups or zones containing the same number of articles as the nucleus when the number of periodicals in the nucleus and succeeding zones will be as, 1, n, n²…." where n approximates fairly closed to the number 5 [4].

In table 7, it has been attempted to apply Bradford's law of scattering in management science. From the table it is found that the most productive 3 journals have produced 2197(36.39%) articles whereas the succeeding 25 moderately productive journals have contributed 2117(35.06%) articles. The rest 485 least productive journals have produced 1724(28.55%) articles. Hence, the ratio of the number of journals in the three successive zones comes out as 3:25:485 or 1: 8:161. Thus the number of periodical in the third zone far out numbers the expected value i.e. 81, where the estimated value of 'n' is 3. Bradford in his empirical study for the data on geophysics and lubrication suggested the value of 'n' to be 5 as a representative number.

So, from the above observations it may be said that the Bradford's law of scattering does not fairly fits in the area of management. As the year of the study was more than 20 years, so it may be the one of the reasons for not fairly fitting the Bradford's law in management sciences. Another reason may be the interdisciplinary nature of the subject as stated earlier.

3.4 Testing Lotka's Law: its application

Lotka's empirical law of scientific productivity (1926) states that y number of authors each credited with x number of papers, is inversely proportional to x, which is the output of each individual author. The relation is expressed as,

$$x^n \propto \frac{1}{y} \quad \text{Or } x^n y = C \tag{i}$$

Where, y is the number of authors making x contributions to the journal; n and C are two constants to be estimated for the specific set of data.

Bookstein5 (1976) has presented a more generalized form of Lotka's Inverse Square Law as:

$$a_n = \frac{C}{n^a} \quad \text{for } n = 1, 2, 3 \ldots \text{and } C > 0 \tag{ii}$$

Where an represents the probability of authors producing n contributions each and C and a are two parameters to be estimated for a specific set of data. The value of productivity constant or characteristic exponent (a) can be determined by considering the values of n (1, 2, 3…) applying either graphical or mathematical method. So, according to Lotka, the highly productive authors form a very small proportion of the total. Though, the law was based on the study of chemistry and physics literature afterwads it has generated much interest and attracted the attention of researchers and it has been applied and tested in other fields.

In Table 9, an attempt has also been made for the testing of Lotka's Law as mentioned earlier. In case of the present study, total number of persons with single contribution are 3073 (78%); number of persons with 2 contributions are 628 (16%); number of persons with 3 contributions are 197 (5%). The expected value for 1 contribution is 4112, for 2 contributions are 768 and for 3 contributions is 341. So, from the above mentioned table it is found that in case of management science, the distribution some how agrees Lotka's Law and stands true.

3.5 Inferences

From the analysis and interpretations in the prceeding sections a lot of findings have already been mentioned during the analysis and interpretation. Moreover, some of the findings may be mentioned as:

3.6 Authorship Pattern

During the period under study, there exists a clear growth in terms of the contribution made by Indian authors which is evident from different literary wanrants. It is also noticed that in social sciences specifically in management, the single authorship is prevalent and collaborative research is very feable.

3.7 Growth of the Subjects

It has been observed that during the period under study, marketing management is being growing up rapidly. Compared to other subjects, more and more articles were produced by the Indian authors during eighties as well as in nineties. Due to the growth in management institutions resechers/faculties, corporate

Table 7. Bradford's law and management literature

Bradford's Zones	No of Journals	No of Articles	Percentage of Articles
I: Most productive	3	2197	36.39
II: Moderately productive	25	2117	35.06
III: Least productive	485	1724	28.55
Total	513	6038	100

Table 9. Application of lotka's law in management literature

	1 contribution	2 contributions	3 contributions	n contributions
Collected Value	3073	628	197	51
Expected value	4112	768	341	51

peoples are concentrating more on Marketing Management during this period. So, it may be said that during this period marketing management was the thrust area of research.

3.8 Proliferation of Journal Titles

It is evident from the preceeding analysis that more and more new journals are also being published in management from India during the period. Due to the stringency in funds allocation most of the libraries have compelled to restrict their subscriptions to periodicals to a limited number. So, the allocation of funds should also be rational enough. These high ranking journals i.e the core journals would help the library management in making their acquisition policy.

3.9 Productivity of Authors

It is to be noted that most of these high productive authors are mostly from IIMs i.e. from the top management schools across India.

Indian contribution as compared to Global contribution. An attempt has also been made to compare the Indian management literature with global management literature. Year-wise data has been juxtaposed with percentage scored where it depicts that those from Indian contributors are moderately low.

4. CONCLUSION

In conclusion it may be said that as the main objective was to trace out the trend in management research in India, so it is worthwhile to be mentioned here that the publishing trend totally depends on the quantitative output of contributors, patterns of contributionsas well as the quality of research.

With the help of such a data analysis, it may be concluded that there exists a clear growth in respect of the trend of growth of institutions of management as well as noticeable contributions by the Indian scholars. So far as authorship pattern is concerned, it may be said that like other social sciences, in management also, the authors are self reliable to contribute independently in peer reviewed/ refereed journals globally. It also reveals that authors' affinity towards the management science is fully acknowledged due to their dynamism, prospects and prosperity. It summarizes the trends in the reporting of interdisciplinary research, as measured through an indicator contained in investigation of management

professionals. It enriches us with the best opportunity to examine the prevalence of interdisciplinary research among individuals leading to MBA/doctoral degrees in India. No other available data sources provide opportunity to such a comprehensive representation of scholars, making the examination of trends from the survey of management professionals as a valuable insight into the current status on interdisciplinary research.

5. SUGGESTIONS

Through the present research work it is revealed that India has already gained enough recognition in the field of management. Indian companies are also spreading overseas. The availability of a vast pool of science graduates as well as social science graduates, good regulatory processes and the cost benefit have placed India on a favorable investment destination by the way of globalization, mergers and acquisition and alliances. But at present India lacks a lot of any standard secondary databases (abstracting /Indexing) in management, may be due to its inter-disciplinary nature which may bring all resources to cater further research. Keeping these problems in mind few suggestions have been proposed:

- collaborative research should be encouraged;
- it may be inferred that Indian authors of management sciences should put more and more concentration on publishing their research out put in foreign journals;
- to launch a regular citation analysis with the help of fulltext database in the domain of management science in India. This will certainly strengthen the study on further research and in-depth study. This may be enhance the library managers' experience for making their acquisition policies on high ranking journals;
- to measure institutional productivity, such type of studies may be performed with the help of Web of Science;
- to encourage collaborative studies as is done in pure sciences with the help of standard management fulltext database; and
- to make an effort to develop a standardized database in the domain of management sences in India which is lacking till today.

In conclusion it may be pertinent to infer that the research aspect of any social science discipline in 21st

century is very trendy and it may not always be easy to capture totally the complexity of the development process of any hybrid field like management. However, it is felt that this type of studies would definitely promote the culture of 'research assessment studies' at the larger aggregates in social sciences in India.

निष्कर्ष

निष्कर्ष स्वरूप यह कहा जा सकता है कि भारत में प्रबंधन अनुसंधान की प्रवृति का पता लगाना मुख्य उददेश्य था ताकि यहां इस बात का उल्लेख करना सार्थक होगा कि प्रकाचान प्रवृति पूरी तरह से योगदानकर्ताओं के मात्रात्मक उत्पादन, योगदान के पैटर्न के साथ साथ शोध की गुणवत्ता पर निभर करती है।

इस तरह के एक डाटा विश्लेषण की मदद से, यह निष्कर्ष निकाला जा सकता है कि भारतीय विद्वानों द्वारा प्रबंधन संस्थान के विकास की प्रवृति के संबंध में स्पष्ट वृद्धि के साथ साथ ध्यान देने योग्य योगदान भी मौजूद है। जहां तक साहित्य कार्यों के पैटर्न का संबंध है, तो यह कहा जा सकता है कि अन्य सामा. जिक विज्ञानों की तरह प्रबंधन में भी लेखकों ने स्वयं विश्वसनीय और स्वतंत्र रूप से योगदान करने के लिए सामंत/विश्व स्तर की संदर्भित पत्रिकाओं में समीक्षा की है। इस बात का भी पता चलता है कि प्रबंध विज्ञान की द्चाा में लेखक आत्मीयता को उसकी गतिशीलता, संभावनाओं और समृद्धि के कारण पूरी तरह से स्वीकार कर लिया गया है। यह अंतविषय अनुसंधान की रिपा. `टिंग में प्रवृतियों का सार प्रस्तुत करता है, जिन्हें प्रबंधन पेशवरों

की जांच में निहित एक संकेतक के माध्यम से मापा जाता है। यह भारत में एमबीए/डॉक्टरेट की उपाधि प्राप्त करने के लिए अग्रणी व्यक्तियों के बीच अंतविषय अनुसंधान के प्रसार की जांच करने के लिए सर्वोत्तम अवसरों के साथ हमें समृद्ध करती है। वर्तमान में अंतविषय अनुसंधान पर एक महत्वपूर्ण जानकारी के रूप में प्रबंधन पेशेवरों के सर्वेक्षण से प्रवृतियों की परीक्षा करते हुए कोई अन्य उपलब्ध डाटा स्रोत विद्वानों को इस तरह के व्यापक प्रतिनिधित्व करने के लिए अवसर प्रदान नहीं करते हैं।

REFERENCES

1. Management. In Heyel, C. (Ed.), The Encyclopedia of management (3rd ed). New York: Van Nostrand Reinhold Co.,1982
2. Management. In Webster's Third New International Dictionary. Merriam Webster, U.S.; New edition edition, 2008.
3. Ray, Arabinda. Fifty years of Indian Management-an insider's view. Oxford University Press: New Delhi, 1999.
4. Coleman, S.R. Bradford distributions of social-science bibliographies varying in definitional homogeneity. Scientometrics, 1993,27(1):75-91
5. Bookstein, A. The bibliometric distribution, *Library Quarterly*, 1976, 46 (4), 416-423.

पुस्तकालय, सूचना विज्ञान और प्रौद्योगिकी सार में क्लाउड कम्प्यूटिंग रिसर्च में ग्रन्थकारिता नमूना (ऑथरषिप पैटर्न) का विश्लेषण

Authorship Pattern in Cloud Computing Research in Library, Information Science & Technology Abstracts

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सारांश

हाल के दिनों में, क्लाउड कम्प्यूटिंग एक लोकप्रिय विषय है, जिसमें कई पहलू और विभिन्न प्रौद्योगिकियां शामिल हैं, जो इंटरनेट पर मापने योग्य आईटी संबंधित सेवाएं प्रदान करती हैं। पिछले कुछ वर्षों में आईटी और व्यापार के क्षेत्र में इसकी अवधारणा और आवेदन के बारे में काफी कुछ लिखा गया है। इस अध्ययन का उद्देश्य पुस्तकालय एवं सूचना विज्ञान सार (एलआईएसटीए) से, 2009–2013 की अवधि में क्लाउड कंप्यूटिंग अनुसंधान में ग्रन्थकारिता के नमूने का अध्ययन करना है। एसपीएसएस सॉफ्टवेयर की मदद से डाउनलोड किए गए 108 डेटा का विश्लेषण किया गया। वर्तमान अध्ययन का उद्देश्य विद्वानों के प्रकाशन की विकास दर का पहचान और विश्लेषण करना, शीर्षक की मानक लंबाई की पहचान करने के लिए ग्रन्थकारिता पैटर्न का विश्लेषण करना, लेखकों द्वारा इस्तेमाल किये जाने वाले लोकप्रियता मेल डोमेन पता करना, और क्लाउड अनुसंधान की संगणना में पत्रिकाओं के रैंक की जांच करना है।

ABSTRACT

Cloud computing, is a popular topic in recent days involves many aspects and various technologies that provides scalable IT related services over the internet. In last few years much has been written about concept and its applications in the IT and business fields. The aim of this study is to study authorship pattern in cloud computing research from 2009-2013 from library & information science abstracts (LISTA). The download 108 data were analysed with the help of SPSS software. The objective of the present study is to identify and analyses the growth rate of scholarly publication, analyses the authorship pattern, to identify the standard length of title, also to know the popularity mail domain used by authors and to examine the rank of journals in cloud computing research.

Keywords: Cloud computing, authorship pattern, degree of collaboration, LISTA, bibliometrics, scientometric

1. INTRODUCTION

Scientific development is a continuous process attributed to theoretical and applied research conducted by scientists, academicians, professionals and researchers. They continuously aspire for doing perfectly in their research domain, by translating the research results as publications in discipline-specific international and national journals. Consequently, scientific productivity and visibility are enhanced globally, regionally and locally[1].

In the field of information technology (IT); cloud computing has been become a principle for aria in recent days. In shortly, cloud computing is a new technology that changing the way of implementing information technology in organization today, thus the core mission of libraries are being to provide and delivering the best information services to users; and librarians have to be willing to capture the advantage of useful resources, including computer technologies[2].

Scientometrics: Is the study of measuring and analysing science research. In practice, scientometrics is often done using bibliometrics . Modern scientometrics is mostly based on the work of Derek. J. de Solla Price and Eugene. g. (http://en.wikipedia.org/wiki/Scientometrics)[3].

Bibliometrics: It is a set of techniques to quantitatively analyze academic literature. While bibliometric techniques are most often used in the field of library and information science, bibliometrics have wide applications in other areas. Bibliometrics was found by Alan Pritchard in a

paper published in 1969, titled Statistical Bibliography or Bibliometrics? He defined the term as "the application of mathematics and statistical methods to books and other media of communication". (http://en.wikipedia.org/wiki/Bibliometrics)[4].

1.1 Library, Information Science Abstracts

Library, Information Science & Technology Abstracts (LISTA) indexes more than 560 core journals, nearly 50 priority journals, and nearly 125 selective journals; plus books, research reports and proceedings. Subject coverage includes librarianship, classification, cataloging, bibliometrics, online information retrieval, information management and more. Coverage in the database extends back as far as the mid-1960s (http://web.a.ebscohost.com)[5].

2. REVIEW OF LITERATURE

The relevant data was collected from various books and journal articles which were treated as a basis for the study. Review of relevant literature is an important step for research. After formulating research problem the process of reviewing the related literature was started.

Khaparde[6] she studied the pattern of information use by researcher in the field of library and information science. It is based on the references appended to International Journal of "Library Hi Tech" during 2005-2009. The present study is based on 3876 references appended to 247 articles contributed by the authors in Library Hi Tech. In Authorship pattern it was found that Solo Research is Predominant than Collaborative Research. The degree of research collaboration was calculated and it was found that the single authorship trend increased gradually in Library Hi Tech.

Thirumagal[7] this paper deals with bibliometric study on the publication of "Osteoarthritis" research. The Total number of 31.456 records is collected from PubMed resource MEDLINE during 2001 to 2012. The study found that there is a gradual growth in Osteoarthritis research, Also showed that joint authors produce more and more records than single authors.

Khaparde and Pawar[8] studied the authorship pattern and author's collaborative research in Information Technology with a sample of 17917 articles collect from LISA during 2000-2009.The average number of authors per article is 1.80. In the study the degree of collaboration (C) during the overall 10 years (2000-2009) is 0.71, but the year wise degree of collaboration is almost same in all the years of mean value 0.49. According to 10 years of period, the multi- authorship articles are higher and predominant on single authorship. The study found that the researches in Information Technology are keep toward team research / group research rather than solo research.

Khaparde[9] her paper conducted the Bibliometric Analysis of Research Publication of Department of Chemistry, Dr. Babasaheb Ambedkar Marathwada University, from 1975 to 2012. 774 research publications were analysed from 144 journals. The study examines year-wise distribution of papers, authorship pattern, journal in which author publish. Results revealed that the number of publications was increasing consistently from 1975 to 2012. Out of 774, there are 25% of publications made in 2009, 2010, and 2011. The majority of the publications are made with 4 authors. And also the majority of the research paper published in journal of heterocyclic chemistry.

3. OBJECTIVE OF THE STUDY

The objectives of the present study are:
- To find out the Year-wise distribution of publications.
- To find out the Relative Growth Rates [R(c)] and Doubling Time [Dt(c)] of publications.
- To identify the group Co-efficient value for collaborative authors of publications.
- To find out the Year-wise length of pages.
- To find out the Relative Growth Rates [R(c)] and Doubling Time [Dt(c)] for pages.
- To identify the length of the title of each papers.
- To identify the popularity of the domain of email ID as used by the contributors.
- To identify the core journals of publications.

4. METHODOLOGY

The data pertaining to Library, Information Science & Technology Abstracts (LISTA) regarding 108 articles on cloud computing made from 2009 to 2014. The analysis conducted relative growth rate, authorship pattern, and degree of collaboration. K. Subramaniam's formula is been used to analyze the degree of collaboration in quantitative terms. Data were subsequently examined, observed, analyzed by Statistical Package for Social Sciences (SPSS) Software, and tabulated for making observations.

5. ANALYSIS AND INTERPRETATION

According to objectives of the study, analysis and interpretation are outlined here:

From Table No. 1 and Fig No.1 Attempt was made to find out the number of articles published during 2009 to 2012. Out of 108 articles, there are equal numbers 21(19.4%) articles were published in 2009 and 2010. 24 (22.2%) articles were published in 2012 and 23 (21.3%) articles in 2013 and 19 (17.6%) articles in 2014.

Table 1. Year-wise distribution of publication

Year	No. of articles	Percentage
2009	21	19.4
2010	21	19.4
2011	23	21.3
2012	24	22.2
2013	19	17.6
Total	108	100
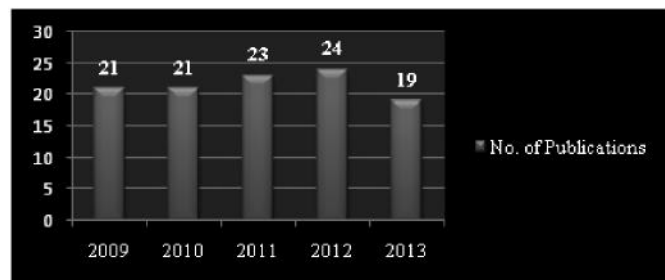
Figure 1. Year-wise distribution for publication.

Table 2 Relative growth rate [RG(P)]and doubling time [Dt(P)] in cloud computing research in library, information science & technology abstracts (LISTA). It can noticed that the relative growth rate of publication [RG(P)] highly decrease from the rate of 0.693 in 2010 to 0.193 in 2013. The mean relative growth (i.e. 2009 to 2013) showed a growth rate of 0.327. The corresponding Doubling Time for different years [Dt(P)])] gradually increased from 1 in 2010 to 3.951in 2013. Thus as the rate of growth of publication was

decreased, the corresponding Doubling Time was increased.

5.1 Categories of Authors and Collaborative Researches

There is several of degree methods proposed to calculate the degree of research collaboration. Here in this study the formula proposed by Subramanyam (1983) has been used.

Formula,
C = NM/(NM+NS)
Where,
C= degree of collaboration
Nm= number of multi author
Ns = number of single author

Among the 108 articles of cloud computing of the Library, Information Science & Technology Abstracts (LISTA) published during 2009 to 2013, there were 79.57 percent were written by single authors, 20.43
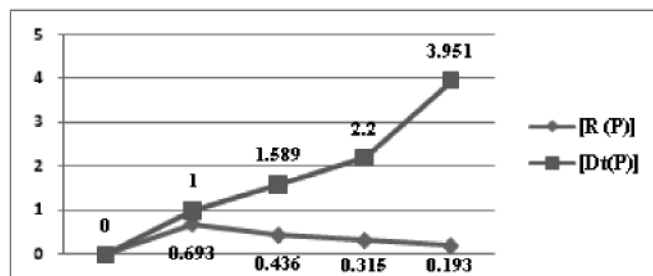
Figure 2. Relative growth rate [RG(P)] and doubling time [Dt(p)] of publications.

Table 2. Shows relative growth rate [RG(P)] and doubling time [Dt(p)] of publications

Year	No. of articles	Cumulative	Loge1P	Loge2P	[R (P)]	Mean [R(P)]	[Dt(P)]	Mean Dt(P)
2009	21	21	-	3.045	-		-	
2010	21	42	3.045	3.738	0.693		1	
2011	23	65	3.738	4.174	0.436	0.327	1.589	
2012	24	89	4.174	4.489	0.315		2.200	1.748
2013	19	108	4.489	4.682	0.193		3.951	

Table 3. Group co-efficient value for collaborative authors of publications

Number of authors' publications	Number of publication	Percentage for total publications	Value of per C= C= NM/(NM+NS)
Number of personal author publications	93	-	
Number of single author publications	74 (NS)	79.57	
Number of co-authors publications	19 (Nm)	20.43	0.20
Two authors publications	9	9.67	0.09
Three authors publications	7	7.53	0.07
Three authors publications	3	3.23	0.03

percent belonged to co-authors and 15 articles not having name of any authors. Therefore, the extent of collaboration was not much popular among the Library, Information & Technology Science Abstracts (LISTA). The value of group co-efficient (gp) was only 0.20.

The degree of collaboration among the co-authors was minimum (0.14) in articles written by more than three authors and maximum (0.09) in two authors publications. So among the collaborative publications, the authors prefer to work jointly.

From the Table 4 It is seen that the majority 71 (65.7%) of publications have page length from 1 to 3. Followed by 28 (26.00%) have page length from 4 to 9. Whereas 9 (8.30%) of publications have page length from 10 to 13.

The relative growth rate [R(P)]and doubling time [Dt(P)] of pages in Table 5 and Fig. 3. It can noticed that the relative growth rate of pages [R(P)] gradually decrease from the rate of 1.015 in 2010 to 0.121 in 2013. The mean relative growth (i.e., 2009 to 2013) showed a growth rate of 0.429. The corresponding Doubling Time for five years [Dt(P)] gradually increased from 0.683 in 2010 to 1.662 in 2012. It also shows that there is highly increased in Doubling Time 5.727 in 2014. Thus as the rate of growth of pages was decreased, the corresponding Doubling Time was increased.

5.2 Length of the Title

It is important to measure the length of the title to identify the preferred size of the title in the specific field. To note down the length of the title,

Figure 3. Shows relative growth rate [r(p)] and doubling time[dt(p)] of pages.

the prepositions are not taken in the count. The fact may be represented with the help of the Table 6.

From the Table 6 it may be stated that the preferred length of title contain (4) words in 2009, and 6 words in 2010 and 2011. Also the study revealed the preferred words of titles in 2012 are (5, 6 and 10). And also the preferred length of the title in 2013 is (5) words.

5.3 Popularity of the E-mail Domain

At now days, e-mail is considered as one of the best communication media for keeping literacy\academic communication for the betterment and development of the community as a whole[10].

From the Table 7 and Fig. 4 observed that maximum 43 (46.24%) out of 93 of the authors are not mentioned their email address in their papers. It may be that they don't have mail address or not interest to mention it. Otherwise, there 22(23.65%) are using institutional domain in e-mail address. And others 21(22.58%) are using different mail addresses. While few authors 7(7.53%) are using Gmail.

Table 4. Year-wise distribution for length of pages

Length of pages	2009	2010	2011	2012	2013	Total	Percentage
1-3	16	16	13	13	13	71	65.7
4-6	5	2	4	3	4	18	16.7
7-9	0	1	3	4	2	10	9.3
10-12	0	0	1	3	0	4	3.7
>=13	0	2	2	1	0	5	4.6
Total	21	21	23	24	19	108	100

Table 5. Relative growth rate [R(P)] and doubling time [Dt(p)] of pages

Year	No. of pages	Cumulative	Loge1P	Loge2P	[R(P)]	Mean[RGR(P)]	[Dt(P)]	Mean Dt(P)
2009	46	46	-	3.829	-		-	
2010	81	127	3.829	4.844	1.015		0.683	
2011	103	230	4.844	5.438	0.594		1.167	
2012	119	349	5.438	5.855	0.417	0.429	1.662	1.848
2013	45	394	5.855	5.976	0.121		5.727	

Table 6. Year-wise distribution for length of title

No. of words	2009	2010	2011	2012	2013	Total	Percentage
1	1	0	0	0	0	1	0.9
2	1	0	1	1	0	3	2.8
3	4	1	2	3	3	13	12.0
4	8	1	1	1	2	13	12.0
5	2	2	4	4	6	18	16.7
6	0	7	8	4	3	22	20.4
7	1	3	2	3	1	10	9.3
8	3	4	0	2	1	10	9.3
9	1	0	1	1	1	4	3.7
10	0	2	2	4	2	10	9.3
11	0	0	1	0	0	1	0.9
12	0	0	1	0	0	1	0.9
13	0	1	0	0	0	1	0.9
20	0	0	0	1	0	1	0.9
Total	21	21	23	24	19	108	100

Table 7. Domain of e-mail id of the contributors

E-mail ID	2009	2010	2011	2012	2013	Total	Percentage
Gmail	2	2	1	1	1	7	7.53
Institutional	7	5	1	4	5	22	23.65
Others	2	2	11	5	1	21	22.58
Not mentioned	8	12	5	9	9	43	46.24
Total	19	21	18	19	16	93	100

Note: 15 articles are not given the name of authors
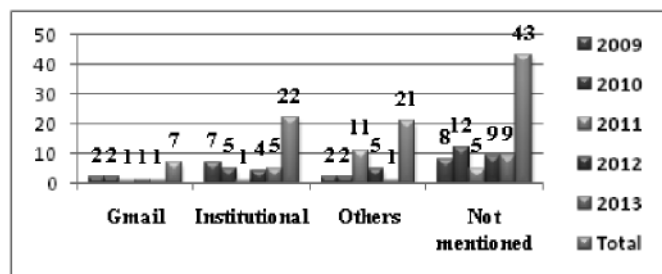
Figure 4. Domain of e-mail id of the contributors.

5.3.1 Ranking of Journals in Cloud Computing Research

Ranking of the journals based on published articles on cloud computing during the study period presented in the Table 8.

It was observed that the *Information Management Journal* ranked 1st in position than other journals with majority number of records, i.e., 16 (14.81%). Followed by *Information Today* 13 (12.04).

6. FINDINGS

The major findings of the study may be noted as under:

1. The number of contributions (cloud computing) found to be the highest is 24 in the year of 2012.

2. The Relative Growth Rate of Publication [RG(P)] highly decrease from the rate of 0.693 in 2010 to 0.193 in 2013. Whereas The corresponding Doubling Time for different years [Dt(P)])] gradually increased from 1 in 2010 to 3.951 in 2013.

3. From authorship pattern it is found that maximum (74 out of 93) paper was single authored followed by the two authored papers (9 out of 108).

4. The extent of collaboration was not much popular among the Library & Information Science & Technology Abstracts (LISTA). The value of group co-efficient (gp) was only 0.20.

5. The standard length of pages as per the study is one to three pages. The shortest length of the pages contains one page and the longest length of pages contains thirteen pages.

6. The relative growth rate of pages [R(P)] gradually decrease from the rate of 1.015 in 2010 to 0.121 in 2013. Whereas the corresponding doubling time for five years [Dt(P)] gradually increased from 0.683 in 2010 to 1.662 in 2012. It also shows that there is highly increased in doubling time

Table 8. Ranking of journals in cloud computing research

Journal Name	No. of records	%	Rank
Information management journal	16	14.81	1
Information today	13	12.04	2
Computers in libraries	9	8.33	3
Econtent	9	8.33	3
Library journal	6	5.55	4
American libraries	5	4.63	5
El profesional de la información	5	4.63	5
Information world review	5	4.63	5
Journal of digital information management	4	3.70	6
Journal of library administration	4	3.70	6
Library technology reports	3	2.77	7
Australian academic & research libraries	2	1.85	8
Information systems management	2	1.85	8
Information technology & libraries	2	1.85	8
Library media connection	2	1.85	8
Publishers weekly	2	1.85	8
School library journal	2	1.85	8
Access	1	0.93	9
Bmc medical informatics & decision making	1	0.93	9
Chief learning officer	1	0.93	9
Ciencias de la información	1	0.93	9
Infonomics	1	0.93	9
Journal of information systems education	1	0.93	9
Journal of interlibrary loan, document delivery& electronic	1	0.93	9
Journal of scholarly publishing	1	0.93	9
Journal of the society of archivists	1	0.93	9
Km world	1	0.93	9
New review of information networking	1	0.93	9
Online	1	0.93	9
Online searcher	1	0.93	9
Pub res q	1	0.93	9
School library monthly	1	0.93	9
Teacher librarian	1	0.93	9
Visual resources association bulletin	1	0.93	9
Total	**108**	**100**	**/**

5.727 in 2014.

7. The preferred/popularity length of title as per the study is 6 worded title. The shortest length of the title contains one word and the longest length of title contains twenty words.

8. 43 (46.24 %) out of 108 of the authors have not mentioned their email address in their research papers. Otherwise, there are 22 (23.65 %) who are using institutional domain in e-mail address. And also Gmail are not preferred/popularity used by the authors of the study.

9. *Information Management Journal* ranked 1st in position based on published articles on cloud computing than other journals during the study period.

7. CONCLUSION

Cloud computing is a new technology which has recently attracted academically great attention. Total number research literature published in cloud computing from the LISTA database for the year 2009 to 2013 was 108. Single authors are more active and published in cloud computing more than jointly researchers. Now days, mail ID is considered as one of the popularity communication media for keeping academic people communication for the improving and development of the community as a whole, but the study revealed that maximum 43 (46.24 %) out of 93 of the authors are not mentioned their email address in the paper, and few authors 7 (7.53 %) are using Gmail. For cloud computing research the *Information Management Journal* got first rank with 16 (14.81 %).

निष्कर्ष

क्लाउड कंप्यूटिंग एक नई तकनीक है जिसने हाल ही में अकादमिक तौर पर काफी ध्यान आकर्षित किया है। वर्ष 2009 से 2013 तक एसआईएसटीए डेटाबेस से क्लाउड कंप्यूटिंग में प्रकाशित अनुसंधान साहित्य की कुल संख्या 108 थी। एकल लेखक अधिक सक्रिय हैं और क्लाउड संगणना में संयुक्त शोधकर्ताओं की तुलना में अधिक सामग्री प्रकाशित कर रहे हैं। आजकल, मेल आईडी को, पूर्ण रूप में समुदाय के सुधार और विकास के लिए, शैक्षिक जगत के लोगों में संचार रखने के लिए लोकप्रिय संचार मीडिया में से एक माना जाता है, लेकिन अध्ययन से पता चला है कि 93 में से अधिकतम 43 (46.24%) लेखकों ने शोधपत्र में अपने ईमेल पते का उल्लेख नहीं किया है, और बहुत कम लेखक 7 (7.53%) जीमेल का उपयोग कर रहे हैं। क्लाउड कंप्यूटिंग में अनुसंधान के लिए सूचना प्रबंधन जर्नल 16 (14.81%) के साथ पहले स्थान पर है।

REFERENCES

1. Mishra, A., & Singh B. Y. Statistical methodology for the Scientometric study of the growth of medical

sciences in India. *Current Science* (00113891), 2013, **105**(6), 821–826.

2. Thirumagal, A. Osteoarthritis research growth during 2001-2012: A bibliometric study. *IASLIC Bulletin*, 2013, **58**(2), 81–92.

3. Scientometrics. Retrieved on 09, June, 2014. From: http://en.wikipedia.org/wiki/Scientometrics.

4. Bibliometrics. Retrieved on 8, June, 2014. From: http://en.wikipedia.org/wiki/Bibliometrics.

5. LISTA. Retrieved on 10 June 2014. Rom: http://web.a.ebscohost.com.

6. Khaparde, V. Pattern of Information use by Researchers in Library and Information Science. *International Journal of Humanities and Social Science*, 2011, **1**(12), 174–186.

7. Thirumagal, A. & Sethukumari, S. N. Mapping of scholarly research in cloud computing: A bibliometric study. *SRELS Journal of Information Management*, 2013, **50**(5), 667–678.

8. Khaparde, V. & Pawar, S. Authorship Pattern and Degree of Collaboration in Information Technology. *Journal of Computer Science & Information Technology*, 2013, **1**(1), 46–54.

9. Khaparde, V. Bibliometric Analysis of Research Publication of Department of Chemistry, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad. *Journal of Computer Science & Information Technology*, 2013, **1**(1), 65–73.

10. Saha, N. C.; Das, S. K.; & Sharma, A. K. Contributions in the Proceedings of Planner (2006-2010): A Bibliometric Study. *IASLIC Bulletin*, 2013, **58**(2), 93–107.

डेसीडॉक पत्रिका पुस्तकालय और सूचना प्रौद्योगिकी में लेखक उत्पादकता और सहयोग
Author Productivity and Collaboration in DESIDOC Journal of Library and Information Technology

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सारांश

विज्ञान में विभिन्न अध्ययन प्रमाणित कर चुके हैं कि लाभदायक, अनुकूल और सक्रिय लेखक भी अत्यधिक सहयोगी लेखक होते हैं। वर्तमान अध्ययनों से यह निर्धारित किया जा रहा है कि क्या डेसीडॉक (रक्षा वैज्ञानिक सूचना तथा प्रलेखन केन्द्र) के पुस्तकालय और सूचना प्रौद्योगिकी पत्रिका के सबसे ज्यादा अंशदायी लेखक 1996–2013 की अवधि के दौरान सबसे अधिक सहयोगी लेखक रहे हैं। चौबीस लेखक ऐसे हैं जिन्होंने इस अवधि के दौरान या तो पांच प्रकाशनों को प्रस्तुत किया है या पांच से अधिक में अपना योगदान दिया है। एम. गुप्ता उच्च प्रस्तुतकर्ता होने के साथ साथ एक सहयोगी लेखक रहे हैं। इसके अलावा, उच्च प्रस्तुतकर्ता और सहयोगी लेखकों के स्पीयरमैन रैंक सहसंबंध ह्रो तवी के संदर्भ में की गणना की गयी है जो एक सकारात्मक संबंध को दर्शाती है।

ABSTRACT

Various studies in sciences have witnessed that productive, prolific and active authors are also highly collaborative authors. The present study has been carried out to determine whether the most contributive authors of *DESIDOC Journal of Library and Information Technology* are also the most collaborative authors during the period 1996-2013. There are twenty four authors who have produced five or more than five contributions during this period. B. M. Gupta is the highly productive as well as the collaborative author. Also, a spearman rank correlation (in terms of rho) of highly productive and collaborative authors has been calculated which shows a positive correlation.

Keywords: Author collaboration, author productivity, DESIDOC journal of library and information technology, bibliometrics

1. INTRODUCTION

Collaborative research is a well recognised feature of modern science, and there has been a consistent trend towards increased collaboration in all branches of science during the present century[1]. Communication and collaboration between researchers are of great importance in the development of subject areas and in the dissemination of research results. As the new results and investigations filter through the network of interested parties, new insights are obtained and people are inspired to work on the same or related research fields. People cooperate to investigate problems that are almost impossible to solve by an individual working alone[2]. Through joint efforts, individuals are able to compete better in this increasingly dynamic, complex and interactive economy. In particular, collaboration in research is even more important, as knowledge is becoming more specialised as a result of the division of labour[3].

The relationship between collaboration and productivity appears to rest on the number of collaborators. The greater the number of collaborators, the greater is the potential for increased productivity. Indeed, a recognized trend in collaboration is the increase of multiauthorship[4]. Regarding the author productivity one can say that, author productivity means authors productiveness or author's efficiency in publication. In other words author productivity can be explained as the effectiveness of productive efforts to produce fruitful publication[5]. It is often presumed that multiple authorship in a paper is a direct consequence of collaborative research of the authors in a group or team[6].

Information dissemination is one of the principle duties of librarians and information scientists. It is very important for them to have a clear knowledge of the productive as well as collaborative authors in any subject field and refer them to researchers in relation to their collaboration.

Therefore, the present study has been undertaken with the sole purpose of identifying the collaborative and productive authors in the *DESIDOC Journal of Library and Information Technology* (DJLIT). The study also seeks to determine whether the most active, prolific and productive authors are also the most collaborative authors. Bibliometrics tool has been used for conducting this study. It is the application of statistical techniques to the literature of a given subject.

1.1 Literature Review

A lot of researches on author productivity and collaboration especially in sciences have been carried out. Most studies of author collaboration includes an assumption that collaborative activity increases research productivity[7,8]. There is strong relation between author productivity and collaboration[9].

Harande[10] carried out a study in literature of technology (1993-95) to determine whether the most productive authors were most collaborative. The study however, found that the degree of collaboration in the literature of technology was very low. The productive authors were positively correlated with collaborative authors.

Subramanyam[11] in his study identified various types of collaboration, i.e., collaboration among colleagues, between organizations, teacher and pupil, supervisor and assistant, researcher and consultant and international collaboration. He concluded that there was more author collaboration in sciences than in humanities.

Egghe, Goovaerts and Kretschmer[12] in their study investigated the problem to prove that higher the number of papers of an author, the higher his/her fraction of co-authored papers (with at least one co-author). The investigation was done on two different data sets – all articles in *Scientometrics* (from vol 1 onwards up to the end of 2007) and the institutional repository of the Universiteit Hasselt, containing 7,604 articles (Feb. 27, 2008). In the first case, no asserted relation was proved but in the latter, it was proved that high productivity leads to high fractions of co-authored papers whereas low productivity can have low or high fractions of co-authored papers.

Aliyu[13] carried out a study on academic scientists of Modibbo Adama University of Technology, Yola to find out correlation between productive and collaborative authors. The study used the weighted average method to determine the extent of author collaboration and spearman rank correlation coefficient was used to find out the correlation between productivity and collaboration among the subjects of the study. The results showed positive correlation between productive and collaborative authors.

Ductor[14] examined data on economists to test the effect of intellectual collaboration on intellectual output. The results showed a positive correlation between collaboration and intellectual output. Over-specialization was detrimental to an author's productivity. More capable authors obtained more benefits from teamwork.

Cheng, Hen, Tan, & Fok[3] findings revealed that researchers tend to work in teams but collaboration was more dominant in science-based research than social sciences.

1.1.1 Objectives

Little is known about the productivity and collaboration of prolific authors in DJLIT. Therefore, the present study aims to
*   Identify the prolific authors of the DJLIT journal covering the period between 1996-2013.
*   Identify the collaborative authors
*   Know the extent of co-relation between the productive and collaborative authors.

1.2 Scope and methodology

The study has been carried out on DJLIT covering the period of 1996-2013. There are 596 contributions contributed by 1058 authors during the period of

Table 1. Ranked list of 24 most productive authors of DJLIT

Name of Authors	1996-2004	2005-2013	Total	Rank
B. M Gupta	6	26	32	1
C. K. Ramaiah	4	13	17	2
S. M. Dhawan	4	9	13	3
Mohinder Singh	1	11	12	4
Ashok Kumar	1	9	10	5
Alka Bansal	5	4	9	7
M. P. Satija	2	7	9	7
Sumit Goswami	5	4	9	7
B. S. Kademani	0	8	8	9.5
K. P. Singh	0	8	8	9.5
A. L. Moorthy	2	5	7	12.5
Adarsh Bala	0	7	7	12.5
M. Natarajan	2	5	7	12.5
Pratibha A. Gokhale	0	7	7	12.5
B. Ramesh Babu	0	6	6	17
K. Nageswara Rao	0	6	6	17
V. G. Talawar	0	6	6	17
Vijai Kumar	0	6	6	17
Vinod Kumari Sharma	3	3	6	17
C. R. Karisiddappa	1	4	5	22
Ganesh Surwase	0	5	5	22
Jagdish Arora	1	4	5	22
Rajendra Kumbhar	0	5	5	22
Shalini R. Lithitkar	0	5	5	22
	37	173	210	

Table 2. Ranked list of author collaboration of DJLIT

Name of author	Single author	Joint author	Multiple	Total	Frequency of collaboration	Rank
B. M Gupta	1	15	16	32	31	1
C. K. Ramaiah	9	6	2	17	8	6
S. M. Dhawan	0	8	5	13	13	2
Mohinder Singh	1	3	8	12	11	3
Ashok Kumar	0	1	9	10	10	4
Alka Bansal	3	2	4	9	6	10.5
M. P. Satija	5	3	1	9	4	17.5
Sumit Goswami	1	1	7	9	8	6
B. S. Kademani	0	2	6	8	8	6
K. P. Singh	1	6	1	8	7	8
A. L. Moorthy	4	3	0	7	3	20.5
Adarsh Bala	1	2	4	7	6	10.5
M. Natarajan	6	1	0	7	1	24
Pratibha A. Gokhale	3	3	1	7	4	17.5
B. Ramesh Babu	1	2	3	6	5	14.5
K. Nageswara Rao	1	4	1	6	5	14.5
V. G. Talawar	1	3	2	6	5	14.5
Vijai Kumar	0	0	6	6	6	10.5
Vinod Kumari Sharma	0	1	5	6	6	10.5
C. R. Karisiddappa	2	3	0	5	3	20.5
Ganesh Surwase	0	0	5	5	5	14.5
Jagdish Arora	2	3	0	5	3	20.5
Rajendra Kumbhar	3	2	0	5	2	23
Shalini R. Lithitkar	2	1	2	5	3	20.5
	47 (23.38%)			210	163 (77.62%)	

eighteen years. The data for the study was downloaded from the webpage of this journal available at http:// publications.drdo.gov.in/ojs/index.php/djlit[15]. For the articles which were not available on the webpage of the journal, the print version was consulted. All these articles along with their pattern of authorship (single, joint and multiple) have been counted to determine authors who have five or more than five publications in this journal. There are twenty four authors fitting into this yardstick referring as productive authors. Also the most collaborative authors out of these are selected and ranked. Finally spearman's coefficient of rank correlation (repeated ranks) is used to find the correlation between the productive and the collaborative authors.

2. RESULTS AND DISCUSSION
2.1 Author Productivity of DJLIT Journal
Table 1 represents author productivity of DJLIT journal covering the period under study. Author productivity (in current context) is defined as the volume of contributions produced by an author within the sample journal. It is clear from this table that B. M. Gupta among the list of authors is the most productive author

who has published 32 articles during the period under study followed by C. K. Ramaiah and S. M. Dhawan with 17 and 13 publications respectively. The findings of the study are that the authors of DJLIT maintain a continuous record of publications confirming to a high productivity pattern.

2.2 Author Collaboration
Out of all the contributions of DJLIT (596) more than half (51.51%) are by multiple authors and 48.49% by single author. Table 2 represents the ranked list of author collaboration of DJLIT from 1996-2013. It reveals that B. M. Gupta is the most collaborative author who has 31 publications in collaboration. This is followed by S. M. Dhawan with 13 publications and Mohinder Singh with 11 publications.

2.3 Correlation between Productivity and Collaboration
Table 3 represents the correlation between productivity and collaboration among the 24 most productive authors of DJLIT. The ranked list of both the productivity and collaboration parameters is

Table 3. A Comparison of productivity ranking with collaboration

Name of author	No. of publications	Frequency of collaboration	Rank of productive authors	Rank of collaborative authors
B. M Gupta	32	31	1	1
C. K. Ramaiah	17	8	2	6
S. M. Dhawan	13	13	3	2
Mohinder Singh	12	11	4	3
Ashok Kumar	10	10	5	4
Alka Bansal	9	6	7	10.5
M. P. Satija	9	4	7	17.5
Sumit Goswami	9	8	7	6
B. S. Kademani	8	8	9.5	6
K. P. Singh	8	7	9.5	8
A. L. Moorthy	7	3	12.5	20.5
Adarsh Bala	7	6	12.5	10.5
M. Natarajan	7	1	12.5	24
Pratibha A. Gokhale	7	4	12.5	17.5
B. Ramesh Babu	6	5	17	14.5
K. Nageswara Rao	6	5	17	14.5
V. G. Talawar	6	5	17	14.5
Vijai Kumar	6	6	17	10.5
Vinod Kumari Sharma	6	6	17	10.5
C. R. Karisiddappa	5	3	22	20.5
Ganesh Surwase	5	5	22	14.5
Jagdish Arora	5	3	22	20.5
Rajendra Kumbhar	5	2	22	23
Shalini R. Lithitkar	5	3	22	20.5

correlated using the procedure for correlating ranked data. The result produced rs= 0.74 indicating strong positive correlation between the twenty four most productive and collaborative authors.

3. FINDINGS AND CONCLUSION

The major findings of the study are:

- There are twenty four authors who have five or more than five publications.
- B. M. Gupta with 32 publications is the most productive as well as the most collaborative author.
- Out of the total research output of DJLIT of eighteen years, only 51.51% contributions are multi-authored and the contributions of the most productive authors (77.62%) are in collaboration. This percent (77.62) is much higher than 51.51% which is overall author collaboration of this journal.
- The productive authors have 23.38% of their publications single authored and 77.62% in collaboration showing preference of productive authors to work in collaboration.

- Correlation between productive and collaborative parameters showed a very strong positive correlation (rs=0.74).

It is concluded that joint and multiple authorship dominates the publication pattern of most of the productive authors of this journal.

निष्कर्ष

अध्ययन के प्रमुख निष्कर्ष इस प्रकार हैं–

- चौबीस लेखक ऐसे हैं जिनके पांच या पांच से अधिक प्रकाशन है।
- 32 प्रकाशनों के साथ बी.एम. गुप्ता सबसे अधिक प्रस्तुतकर्ता होने के साथ साथ सबसे अधिक सहयोगी लेखक हैं।
- डी.जे.एल.आई.टी. की 18 सालों की कुल अनुसंधान प्रस्तुतियों में से केवल 51.51 प्रतिशत योगदान बहु–लेखकों का रहा है और सबसे अधिक प्रस्तुतकर्ता लेखकों के योगदान में 77.62 प्रतिशत सहयोगी लेखकों का रहा है। यह 77.62 प्रतिशत 51.51 प्रतिशत की तुलना में बहुत अधिक है जो इस पत्रिका का समग्र लेखक सहयोग है।
- प्रस्तुतकर्ता लेखकों के पास उनके एकल लेखन प्रकाशन 23.38 प्रतिशत और सहयोग में 77.62 प्रतिशत सहयोग में काम करने

के लिए प्रस्तुतकर्ता की वरियता में दिखाया गया।

• प्रस्तुतकर्ता और सहयोगी मापदंडों के बीच सहसंबंध ने एक मजबूत सकारात्मक सहसंबंध दिखाया। (Rs=0.74)

• इससे यह निष्कर्ष निकला है कि संयुक्त और बहु ग्रन्थकारिता साहित्यकार्य, इस पत्रिका के प्रस्तुतकर्ता लेखकों की बजाय प्रकाशन के पैटर्न पर ज्यादा हावी है।

REFERENCES

1. Vimala, V & Reddy, V. P. Authorship pattern and collaborative research in the field of Zoology. *Malaysian Journal of Library and Information Science*, 1996, **1**(2), 43–50.

2. Ding, Y.; Foo, S. & Chowdhury, G. A bibliometric analysis of collaboration in the field of information retrieval. *The International Information & Library Review*, 1999, **30**(4), 367–376.

3. Cheng, M. Y.; Hen, K. W.; Tan, H. P. & Fok, K. F. Patterns of co-authorship and research collaboration in Malaysia. *Aslib Proceedings: New Information Perspectives*, 2013, **65**(6).

4. Bahr, H. A. & Zemon, M. Collaborative authorship in the journal literature: perspectives for academic. Librarians who wish to publish. *College and Research Libraries*, 2000, **61**(5), 419–20.

5. Sankari, R. L. & Chinnasamy, K. Indian Journal of Biotechnology (IJBT): a scientometric analysis. *International Journal of Library and Information Studies*, 2012, **2**(1), 21–32.

6. Sridhar, M.S. A study of co-authorship and collaborative research among Indian space technologists. *R&D Management*, 1985, **15**(3), 243–249.

7. Rumbold, A. R.; Cunningham, J.; Purbrick, B. & Lewis, J. M. Exploring productivity and collaboration in Australian Indigenous health research, 1995-2008. *Health Research Policy and Systems*, 2013, **11**, 42.

8. Cheng-Chung, C; Ming-Wen, H. & Meng-Chun, L. Improvements in productivity based on co-authorship: a case study of published articles in China. *Scientometrics*, 2010, **85**(2), 463–470.

9. Eaton, J. P.; Ward, J. C.; Kumar, A. & Reingen, P. H. Structural analysis of co-author relationships and author productivity in selected outlets for consumer behavior research. *Journal of Consumer Psychology*, 1999, **8**(1), 39–59.

10. Harande, Y. I. Author Productivity and Collaboration: an investigation of the relationship using the literature of Technology. *Libri*, 2001, **51**(2), 124–127.

11. Subramanyam, K. Bibliometric Studies of Research Collaboration: A Review. *Journal of Information Science*, 1983, **6** (1), 33–38. Retrieved from xa.yimg.com/kq/groups/2458883/1121041985/name/33.full.pdf

12. Egghe, L.; Goovaers, M. & Kretschmer, H. Collaboration and productivity: An investigation into 'Scientometrics' journal and 'UHasselt' repository. *Collnet Journal of Scientometrics and Information Management*, 2008, **2**(1).

13. Aliyu, M. Author productivity and collaboration among academic scientists in ModibboAdama University of Technology, Yola. *The Information Manager*, 2011, **11**(1&2), 32-35. Retrieved from http://www.ajol.info/index.php/tim/article/view/83637/73665

14. Ductor, L. Does co-authorship lead to higher academic productivity? 2012, Retrieved fromhttp://www.massey.ac.nz/~lductor/Ductor_July12.pdf

15. http://publications.drdo.gov.in/ojs/index.php/djlit.

बौद्धिक संपदा अधिकार पत्रिका का बिब्लोमेट्रिक विश्लेषण (2003-2012)
Bibliometric Study on Journal of Intellectual Property Rights (2003-2012)

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सारांश

शोध के उभरते हुए क्षेत्रों में से पुस्तकालय में संदर्भात्मक अध्ययन भी एक क्षेत्र है और सूचना विज्ञान को साहित्य में दिये हुए एक दिये हुए क्षेत्र के भीतर प्रकाशन पैटर्न का पता लगाने के लिए प्रयोग किया जाता है। इस अध्ययन में, लेखकों ने बौद्धिक संपदा अधिकार पत्रिका को चुना है, जो एन आई एस सी ए आई आर, नई दिल्ली द्वारा प्रकाशित एक त्रैमासिक पत्रिका है। पत्रिका में 2003–2012 की अवधि के विषयों का विश्लेषण किया गया है और विश्लेषणों के आधार पर प्राप्त किये गये परिणामों का प्रस्तुत लेख में चर्चा की जा रही है।

ABSTRACT

Bibliometric study is one of the emerging area of research in Library and Information Science is used to find out the publication pattern within a given field of literature. In this study, the authors have chosen the Journal of Intellectual Property Rights, which is a quarterly journal published by NISCAIR, New Delhi. Journal issues from 2003 to 2012 have been analysed and results obtained based on the analysis are discussed in the article.

Keywords: Bibliometric study, intellectual property rights, metric study

1. INTRODUCTION

Bibliometric/scientometric study is a type of research methods emerged in late sixties and in nineteen seventies and eighties, these studies have grown steadily and become a prominent discipline in Library and Information Science. The word 'bibliometrics' was first coined by Alan Pritchard in 1969 for measuring the books and other media of communication with the help of mathematics and statistics[1].

Bibliometrics is emerging as one of the area of research in Library and Information Science (LIS). The quantitative and statistical methods are utilized to describe the patterns of publication within a given field of literature. It can also be used to study regional patterns of research, the extent of cooperation between research groups and national research profiles, influence of single author or describe the relationship between two or more authors or works. It involves the analysis of a set of publication characterized by bibliographical derivatives such as author(s), place of publication, the associated key words, citation, co-citation analysis, etc.[2]

As per Maheswarappa[3], one-fourth of all the articles published in LIS periodicals are on bibliometrics and its related topics. Bibliometrics is analogues to Ranganathan's Librametrics, Russian concept Scientometrics, FID's Informetrics, and also some other well established sub disciplines like Econometrics, Psychometrics, Sociometrics, and Biometrics, where mathematical and statistical techniques are systematically applied to study and solve problems in their respective fields.

With the advent of information and communication technology (ICT), the availability of different databases in CD-ROMs and web, the bibliometric study has gained a momentum and made easy to search any information easier and this made bibliometric study much easier by eliminating manual searching and analyzing the database[4].

Journal of Intellectual Property Rights is a peer-reviewed quarterly journal devoted to publishing papers on all aspects of intellectual property rights is brought out by National Institute of Science Communication and Information Resources (NISCAIR), New Delhi[5]. In order to find out the publication patter of the journal,

the authors analysed 10 years issues of the journal and results have been given at the end of the article.

2. OBJECTIVES OF THE STUDY

The present study is being carried out with the following objectives to:

(i) Make an analysis of articles published in Journal of Intellectual Property Rights from 2003 to 2012
(ii) Study the authorship pattern of publication during the study period
(iii) Study the number of articles published during the study period
(iv) Study the average number of references per article
(v) Find out the country-wise publication of articles
(vi) Find out the state-wise distribution of articles, and
(vii) Find out the institution-wise distribution of articles.

3. METHODOLOGY

The bibliographic records for the analysis are limited to articles published in 10 years of the *Journal of Intellectual Property Rights* during 2003-2012. The articles have been collected from the NISCAIR's web site and each issue of the journal was studied in order to ascertain the number of articles, authorship

pattern, references, pages, geographical distribution, and so on. The data have been entered in MS Office Excel and the results of the analyzed data are being given in the following tables.

4. DISTRIBUTION OF ARTICLE
Article-wise distribution

Table 1 shows articles-wise distribution in the journal. It revealed that 415 articles have been published in 10 years. From the table, it is noted that the highest number of articles 56 (13.46 %) were published in 2012 and less number of articles 23 (5.54 %) were published in 2003. It is also found that on an average 41.5 articles were published and number of articles published per year gradually increased from 2003 to 2008 and decreased from 2009 to 2010 and again increased from 2011 onwards.

4.1 Author-wise Distribution

In order to find out the authorship pattern to know the authors collaboration, the collected data has been analysed and displayed in Table 2.

It is noted from Table 2 that nearly two-third of the articles 274 (66.02 %) were published by single author followed by 99 (23.86 %) were published by

Table 1. Article-wise distribution

Year	Vol. Issue No.	No. of articles	Cumulative Total	Percentage	Cumulative %	Average
2003	8 (1-6)	23	23	5.54	5.54	41.5
2004	9 (1-6)	26	49	6.27	11.81	
2005	10 (1-6)	46	95	11.08	22.89	
2006	11 (1-6)	37	132	8.92	31.81	
2007	12 (1-6)	44	176	10.60	42.41	
2008	13 (1-6)	52	228	12.53	54.94	
2009	14 (1-6)	41	269	9.88	64.82	
2010	15 (1-6)	37	306	8.92	73.73	
2011	16 (1-6)	53	359	12.77	86.51	
2012	17 (1-6)	56	415	13.49	100.00	

Table 2. Author-wise distribution of articles

Year	Vol./Issue No.	No. of articles	Single author	Two-author	Three-authors	More than three
2003	8 (1-6)	23	18	3	1	1
2004	9 (1-6)	26	21	3	2	
2005	10 (1-6)	46	29	11	5	1
2006	11 (1-6)	37	22	11	3	1
2007	12 (1-6)	44	30	12	2	
2008	13 (1-6)	52	37	12	0	3
2009	14 (1-6)	41	29	6	4	2
2010	15 (1-6)	37	27	8	2	
2011	16 (1-6)	53	28	16	6	3
2012	17 (1-6)	56	33	17	5	1
10 years	8-17	415	274 (66.02)	99 (23.86)	30 (7.23)	12 (2.89)

double authors and it was found that 30 (7.23 %) of the articles were published by three authors and only 12 (2.89 %) were published by more than three authors. It is noted from the above table that single authors' contribution is high, when comparing with multiple authors, which reveals that research collaboration among the authors are less.

4.2 Foreign Authors' Contribution

Though the journal is published from NISCAIR, Delhi, it is found that foreign authors contribution is also remarkable. In order to find out the foreign authors contribution, the data has been analysed and displayed in Table 3.

Table 3 shows that out of total 616 authors, 454 (73.70 %) authors were from India and rest 162 (26.30 %) of the authors were from abroad. Hence, it is found that though

the journal is published from India, slightly more than one-fourth of the authors were from foreign countries.

4.3 Page-wise Distribution of Articles

In order to find out the length of pages and average page, the analysed data has been displayed in Table 4. It is observed from Table 4 that total number of pages for 10 years was 3636 and it was found that 2012 issues have more number of pages, i.e., 477 and 2003 issues had less number of pages, i.e., 262. It is noted that 234 (56.39 %) articles have 6–10 pages followed by 90 (21.69 %) had 11–15 pages. It is also found that 71 (17.12 %) articles had 1–5 pages, and only 20 (4.82 %) had more than 15 pages and average page numbers per article was found to be 8.8.

4.4 Distribution of References in the Articles

References plays a major role in articles; it is the tool used to locate the journal article for the users, who need it and also credit is given to the original authors. Table 5 gives a clear picture about the references cited in each volume and the total number of references.

It is clear from Table 5 that the total number of references cited for 10 years was 11,300 and the

Table 3. Indian vs. Foreign authors' contribution

Authors	Numbers
Indian Authors	454 (73.70)
Foreign Authors	162 (26.30)
Total Authors	616 (100.0)

Table 4. Page-wise distribution of articles

Year	Vol. Issue No.	Average = Total Pages/ Total article	1-5 Pages	6-10 pages	11-15 pages	More than 15 pages
2003	8	262	0	13	7	3
2004	9	352	0	10	8	8
2005	10	348	9	29	8	0
2006	11	288	10	22	4	1
2007	12	422	2	25	16	1
2008	13	441	6	35	9	2
2009	14	343	10	19	10	2
2010	15	304	10	19	6	1
2011	16	399	14	33	5	1
2012	17	477	12	28	15	1
2003 - 2012	**(8-17)**	**3636/415=8.8**	**71 (17.12)**	**234 (56.39)**	**90 (21.69)**	**20 (4.82)**

Table 5. Distribution of references in the journal articles

Year	Volume	No. of References	Percentage	Cumulative number of references	Cumulative percentage
2003	8 (1-6)	722	6.39	722	6.39
2004	9 (1-6)	915	8.10	1637	14.49
2005	10 (1-6)	1153	10.20	2790	24.69
2006	11 (1-6)	1343	11.88	4133	36.58
2007	12 (1-6)	1023	9.05	5156	45.63
2008	13 (1-6)	1318	11.66	6474	57.29
2009	14 (1-6)	1015	8.98	7489	66.27
2010	15 (1-6)	947	8.38	8436	74.65
2011	16 (1-6)	1219	10.79	9655	85.44
2012	17 (1-6)	1645	14.56	11300	100.00
Total		**11,300**	**100.00**		

average reference for each year was found 1130. 2012 issues witnessed the highest number of references, i.e., 1645 (14.56 %) and 2003 witnessed the lowest number of references, i.e., 722 (6.39 %).

4.5 State-wise Distribution of Articles

State-wise distribution of article is displayed in the Table 6. From Table 6, it is noted that institutes from New Delhi published 106 articles standing first, followed by West Bengal and Karnataka standing second and third respectively, Maharastra, Andhra Pradesh, and Tamil Nadu published 46, 45 and 28 articles and rest of the states like Uttar Pradesh, Rajasthan published 15 each and Madhya Pradesh, Gujarath and Chattishgarh published 40 articles.

Table 6. State-wise distribution of articles

Name of the State	Number of articles
New Delhi	106
West Bengal	64
Karnataka	57
Maharastra	46
Andhra Pradesh	45
Tamil Nadu	28
Uttar Pradesh	15
Rajasthan	15
Madhya Pradesh	14
Gujarat & Chattishgarh	13 (each)

4.6 Country-wise Distribution of Articles

Country-wise distribution of articles is displayed in the Table 7. It is observed from Table 7 that the United States of America published more number of articles, i.e., 45 followed by United Kingdom, China and South Korea the published 27, 15, and 13 articles respectively and rest of the countries published below 10 articles.

4.7 Distribution of articles by Universities

Universities play a major role in publication, when comparing with other institutions. In order to find out the publication details of universities, the collected data has been analysed and displayed in Table 8.

It is evident from the Table 8 that Indian universities contribution is more, i.e., 163 in comparison to foreign universities.

4.8 Contribution by Indian Institutes

In order to find out the major contributor from India, the collected data have been analysed and displayed in Table 9. Table 9 shows the spread of intellectual property rights papers among the different Indian institutions. Since the number of institutions are more, it is decided to have only top 10 institutions

Table 7. Country-wise distribution of articles

Name of the country	Number of articles
United States of America	45
United Kingdom	27
China	15
South Korea	13
Switcherland	8
Iran	8
Taiwan	5
Brazil	5
Spain	5
Netherlands	4
Australia	3
Italy	3
South Africa`	3
Germany	2
Finland	2
Cuba	1
France	1
New Zealand	1
Auckland	1
Portugal	1
Greece	1
Belgium	1
Nigeria	1
Zimbabwe	1
Chile	1
Nepal	1
Turkey	1
Malawi	1
Philippines	1
Malaysia	1
Sri Lanka	1

Table 8. Distribution of articles by universities

Origin of university	Number of articles
Indian Universities	163
Foreign Universities	77

contribution with minimum 5 papers and more. From Table 10, it is found that National Juridical Sciences, Kolkata occupied first rank, National Law University, Bhopal and Hidayadhulla National Law University, Raipur published same number of papers standing second position, followed by National Law University, Bangalore taking third place and rest of the institutes status is shown in the above table. Overall, top 10 institutions contributed 126 (30.36 %) articles and

Table 9. Contribution of articles by Indian institutes

Name of the Institute	No. of articles	%	Cum. No.	Cum. %
National Juridical Sciences, Kolkata (West Bengal)	46	11.08	46	11.08
National Law University, Bophal (M.P)	13	3.13	59	14.22
Hidayadhulla National Law University, Raipur (Chattisgarh)	13	3.13	72	17.35
National Law University, Bangalore	11	2.65	83	20.00
IIT Kharagpur	10	2.41	93	22.41
National Law University, Jodhpur (Rajasthan)	8	1.93	101	24.34
KIIT University, Bhubaneswar (Orissa)	8	1.93	109	26.27
IIT, Bombay	6	1.45	115	27.71
IIT Delhi	6	1.45	121	29.16
Gujarat National Law University, Gandhinagar (Gujarath)	5	1.20	126	30.36
Other institutions	289 (69.64)	69.64	415	100.00
Total	**415**	**100.00**		

other institutions contributed 289 (69.64 %) articles. It shows that ten institutions contributed nearly one third, whereas other institutions, whose individual contribution is less than five was 289 (69.64 %).

4.9 Major Individual contributor from India

Table 10 displays the data collected and analysed to find out the top five Indian contributors. It is clear for Table 10 that Zakir Thomas, New Delhi published the highest number of articles, i.e., 22 followed by M.D. Nair, Chennai published 20 articles. Rest of the authors such as Sudhir Kochhar, V.K. Gupta and K.V. Raju have published 9, 6 and 3 articles respectively.

Table 10. Major Indian contributor

Name of the contributors	Number of articles
Zakir Thomas, New Delhi (CSIR)	22
M.D. Nair, Chennai (Tamil Nadu)	20
Sudhir Kochhar	9
V.K. Gupta	6
K.D. Raju	3

4.10 Major Individual Contributor from Foreign countries

Three major individual foreign contributors in the journal are given in the Table 11.

From Table 11, it is identified that Deli Yang, Trinity University (USA) and Trevor Cook, UK have

Table 11. Major individual contributor from foreign countries

Name of the contributors	Number of articles
Deli Yang, Trinity University (USA)	7
Trevor Cook, London (UK)	7
Wenqi Liu (China)	4

contributed more articles, i.e., 7 each and Wenqi Liu, China has contributed 4 articles and rest of the foreign authors have contributed less than 4 articles.

5. FINDINGS AND CONCLUSIONS

Journal of Intellectual Property Rights is a journal published by NISCAIR, New Delhi is a bimonthly journal, which focuses on copyright and intellectual property rights related issues. Though the journal is published from India, from the study, it is found that slightly more than one-fourth of the authors were from abroad, which shows that foreign authors showing interest to contribute to the *Journal of Intellectual Property Rights*. 415 articles published in Journal of Intellectual Property Rights from 2003 to 2012 have been analysed and the results have been discussed. From the analysis, it is found that highest number of articles 56 (13.49 %) was published in 2012 with average number of articles per year was found 41.5%. The publication of articles gradually increased except 2006–07 and 2009–2010. Two-third of the articles have been published by single author and rest of the articles were published by two, three and more than three authors, which shows low level of research collaboration. the total number of references cited for 10 years was 11,300 and average reference for each year was found 1130 with 2012 issues witnessed highest number of references, i.e., 1645 (14.56 %) and 2003 witnessed lowest number of references, i.e., 722 (6.39 %) and average number of references per year was found 1130. Though the journal is published in India, countries such as USA, UK, China and South Korea contributions are appreciable. In India, National Juridical Sciences, Kolkata (West Bengal) contributed 46 articles stood first. Regarding individual authors (India) contribution, it was found that Zakir Thomas,

New Delhi (CSIR) 22 articles, followed by M.D. Nair, Chennai (Tamil Nadu) with 20 articles and for foreign authors it was found that Deli Yang, Trinity University (USA) and Trevor Cook, London (UK) both contributed highest number of articles, i.e., 7 each.

निष्कर्ष

बौद्धिक संपदा अधिकार के जर्नल निस्केयर द्वारा प्रकाशित एक पत्रिका है, नई दिल्ली कॉपीराइट और बौद्धिक संपदा अधिकारों से संबंधित मुद्दों पर ध्यान केंद्रित है जो एक द्विमासिक पत्रिका है। पत्रिका ने भारत से प्रकाशित किया जाता है, हालांकि अध्ययन से यह लेखकों में से थोड़ा अधिक से अधिक एक-चौथाई रुचि दिखा विदेशी लेखकों बौद्धिक संपदा अधिकार के जर्नल में योगदान के लिए पता चलता है कि जो विदेश से थे कि पाया जाता है। 2003-2012 बौद्धिक संपदा अधिकार के जर्नल में प्रकाशित 415 लेख विश्लेषण किया गया है और परिणामों पर विचार विमर्ष किया गया है। विश्लेषण से यह 56 (13.49 %) प्रति वर्श लेखों की औसत संख्या के साथ 2012 में प्रकाशित किया गया था लेख की संख्या सबसे ज्यादा 41.5 % पाया गया था कि पाया जाता है। लेख के प्रकाषन के धीरे-धीरे 2006-07 और 2009-2010 छोड़कर वृद्धि हुई है। लेख के दो-तिहाई ही लेखक और लेखों के बाकी के द्वारा प्रकाशित किया गया है अनुसंधान सहयोग के निम्न स्तर से पता चलता है, जो दो, तीन और तीन से अधिक लेखकों द्वारा प्रकाशित किए गए थे । 10 साल के लिए उद्धृत संदर्भ की कुल संख्या 11,300 थी और प्रत्येक वर्ष के लिए औसत संदर्भ 2012 मुद्दों के साथ 1130 में पाया गया था देखा संदर्भ की संख्या सबसे ज्यादा 1645 (14.56 %) और 2003 संदर्भों की सबसे कम संख्या यानी 722 (6.39 %) और औसत संख्या

देखी अर्थात जर्नल ऑफ इंडिया में प्रकाशित हुआ है हालांकि प्रति वर्श सन्दर्भ 1130. पाया गया था की, जैसे अमरीका, ब्रिटेन, चीन और दक्षिण कोरिया के योगदान के रूप में देश प्रशंसनीय हैं। भारत, राष्ट्रीय न्यायिक विज्ञान, कोलकाता (पश्चिम बंगाल) में 46 लेख थम योगदान दिया। के बारे में अलग-अलग लेखकों (भारत) के योगदान, यह जाकिर थॉमस, 20 लेख के साथ एमडी नायर, चेन्नई (तमिलनाडु) द्वारा और विदेशी लेखकों के लिए पीछा नई दिल्ली (सीएसआईआर) के 22 लेख, यह पाया गया है कि पाया गया था कि डेली यांग, ट्रिनिटी यूनिवर्सिटी (अमरीका) और ट्रेवर कुक, लंदन (ब्रिटेन) लेख के दोनों योगदान सबसे अधिक संख्या 7 है।

REFERENCES

1. Bioliometrics. http://en.wikipedia.org/wiki/Bibliometrics, (accessed on 22 April 2013).

2. Rattan, Gurjeet Kaur & Gupta, Kamini. Bibliometric analysis of *Malaysian Journal of Library and Information Science*: 2007-2011. *International Journal of Information Dissemination and Technololgy*, 2012, **2**(4), 307-312.

3. Maheswarappa, B.S. Bibliometrics: An overview, Bibliometric Study, edited by G. Devarajan. Ess Ess Publications, New Delhi, 1997, 1-10.

4. Patra, Swapan Kumar; Bhattacharya, Partha; & Verma, Neera. Bibliometric study of literature on bibliometrics. *DESIDOC Bulletin of Information Technology*, 2006, **26**(1), 27-32.

5. *Journal of Intellectual Property Rights*. http://www.niscair.res.in/ (accessed on 22 April 2013).

वैज्ञानिक दृष्टांत सूची (साइंस साइटेशन इंडेक्स) डेटाबेस के दृष्टिकोण से भारत में नैनोवाटर नवपरिवर्तन परिवेश (इन्नोवेशन क्लाइमेट) का ज्ञान

Knowledge of Nanowater Innovation climate in India through the Lens of Science Citation Index Database

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सारांश

साइंस साइटेशन इंडेक्स डेटाबेस बायोमेट्रिक विश्लेषण का उपयोग करके उभरती प्रौद्योगिकियों के विकास, प्रवृत्ति और प्रगति का पता लगाने के लिए एक महत्वपूर्ण साधन के रूप में उभरा है। बायोमेट्रिक विश्लेषण एक अनुसंधान पद्धति है जिसे किसी अकेले अनुसंधानकर्ता के लिए तथा किसी संगठन या देश के लिए विभिन्न वैज्ञानिक सोपान–व्यवस्था में उपयोग किया जा सकता है। यह विश्लेषण वैज्ञानिक प्रकाशनों के सांख्यिकीय विश्लेषण के संदर्भ में है। यह लेख इस डेटाबेस का उपयोग करके भारत में जल क्षेत्र में नैनो तकनीक के सारवान प्रयोग के संबंध में एक अंतर्दृष्टि प्रदान करता है। यह पत्र उजागर करता है कि इस विशिष्ट क्षेत्र में विश्वभर में कितने पत्र प्रकाशित किए जा चुके हैं और उन शीर्ष देशों का पता लगाता है जो इस क्षेत्र में पत्र प्रकाशित कर रहे हैं। हमने बूलियन स्ट्रिंग खोजों की श्रृंखला का उपयोग करके भारत में इस अनुसंधान क्षेत्र में प्रकाशनों की संख्या का भी विश्लेषण किया है। बूलियन स्ट्रिंग एफपी7 कार्यक्रम में वेधस्थलीय नैनो की रिपोर्ट में प्रयुक्त स्ट्रिंग से निकाले गए हैं, लेकिन इन्हें आधुनिक प्रकाशन संख्याओं और विज्ञान के आईएसआई वेब में हुए परिवर्तनों को समायोजित करने के लिए अद्यतन किया गया है। संबंधित विषय पर प्रकाशन नैनोवाटर अनुसंधान नवपरिवर्तन प्रणाली के संबंध में अंतःदृष्टि प्रदान करते हैं। इस विश्लेषण द्वारा, हमनें प्रमुख हितधारकों, शीर्ष देशों, शीर्ष संस्थानों और विश्वविद्यालयों का पता लगाया जो इस प्रकार का अनुसंधान कर रहे हैं। यह डेटाबेस अकेले सर्वसमावेशी नहीं है, बल्कि यह राष्ट्रीय और अंतरराष्ट्रीय स्तर पर महत्वपूर्ण अनुसंधान क्षेत्र का पता लगाने के लिए एक सूचनाप्रद आधार के रूप में कार्य करता हैं।

ABSTRACT

Science Citation Index Database emerges as an important tool to find out evolution, trend and progression of emerging technologies using bibilometric analysis. Bibliometric analyses is a research method, can be use in different scientific hierarchy, for an individual researchers as well as for an organisation or a country. This analysis refers to of statistical analysis of scientific publications This article draws insight thematic interventions of nanotechnology in water sector in India using this database. This paper highlights how many papers have been published worldwide in this specific area and find out the top countries who are publishing in this area. We also analysed intensity of publications in this research area inIndia using a series of Boolean string searches. The Boolean strings were derived from the strings used in the report of observatory nano in FP7 programme but updated to accommodate modern publication numbers and changes to ISI Web of Science. Publications on the concern topic bring out insight about nanowater research innovation system. By this analysis, we found the major stakeholders, top countries, top institutes and university who are carrying out this kind of research.This database alone is not inclusive but works as an informative base to find out the important research area at national and international level

Keywords: Nanowater, Science Citation Index, database, bibliometric

1. INTRODUCTION

Science Citation Index Database has a great importance to find out evolution, trend and progression of an emerging technologies using bibilometric analysis.

Bibliometric analyses are viewed as a proxy marker of a papers influence and therefore an analysis of the most influential papers published in recent decades in emerging areas like nanotechnology. Characteristics of database is as follow.

Nanotechnology like Information and Communication Technologies, Renewable resources, Biotechnologies is persuaded as a major wave of economy in 21st century

Characteristic	Web of Science
Date	2004
journals	12,000
Languages	English + various regional langauage
Focus (field)	Science, technology, social sciences, arts and humanities
Period covered	1900–present
Databases covered	Science citation index expanded, social sciences citation index, arts and humanities citation index, index chemistry, current chemical reactions
No. of keywords allowed	15
Search	
Abstracts	(+)
Authors	(+)
Citations	(+)
Patents	(+)
Uses	full-text, related articles
Developer	Thomson Scientific and Health Care Corporation (US)
Citation analysis	As for Web of Science plus the total number of articles on a topic or by an individual author cited in other articles

and considered as a revolutionary technology which have immense potential for addressing sustainability challenges ranging from climate change and water contamination to access to healthy food and public safety. At this nano stage, novel behaviour appear as classical move towards to quantum at this intersection1 which make nanotechnology as an enabling technology which becomes the key part in the value chains of different industrial sectors such as water, energy, medicine and environmental remediation, etc. Emergence of this technology as a new inventing method and its utilization across different fields cited this technology as a General Purpose Technologies[2,3,4] so it foster convergence between previously distinct technology-driven sectors and make it an ideal candidate to provide novel interventions in areas of serious concerns worldwide i.e. water, energy, environment, security and medical fields and many more. Nanotechnology can give a path to developing and underdeveloped countries to forge economic growth if they follow it properly[5].

Some interesting membrane technologies are now emerging from developed and developing nations that are highly relevant to the needs of the developing as well as under developed countries[6].

As nanotechnology applications are continuously rising in different industrial sectors like water. It is really important to know that how it is developing in country like India. At this stage, SCI databaseprovide a platform to assess the development of this area. Publications in this specific area were compiled from the
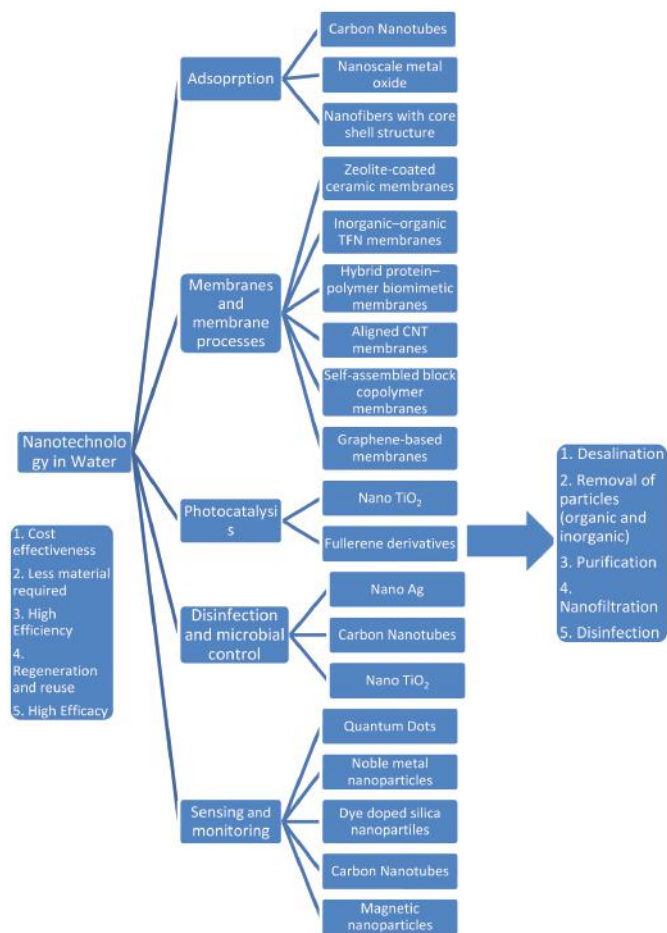
Thomson Reuters ISI Web of Science online publication database using a series of Boolean string searches. The Boolean strings were derived from the strings used in the report of observatory nano in FP7 programme but updated to accommodate modern publication numbers and changes to ISI Web of Science. The key string is as follow; remediat* OR wastewater OR "waste water" OR "drinking water" OR drinkwater OR "drink water" OR "water purification" OR "ground water" OR groundwater OR soil OR "pollutant" OR "toxic compound" OR filtration OR desalination OR "water softening" OR "heavy metal*" OR photocataly* OR membrane* OR contamina* OR arsen* OR zinc OR adsorption OR reduction OR C60 OR fulleren* OR CNT OR nanotube*OR iron OR ZnO OR magenti* OR nanocrystallin* OR "metal oxide*" OR gold OR copper OR dendrimer* OR lead ORoxidat* OR titanium OR TiO* OR silicon OR SiO*OR nanomembrane OR nanofiltration OR photodecomposition OR iron nanoparticles OR Graphene

Nanotechnology applications in water sector represent a field which is drawing attention of each advanced and emerging economies. In fact, innovation in nanotechnology in water sector has been at a core in many countries which can further be seen by research publications in this strategic area. We analysed the number of publications during 2000-2013, in this specific field.

An examination of India's nanotechnology publications relative to global publication trends highlights the growth of nanotechnology for the period of 2000-2013. It is clear that nanotechnology research has become a significant research discipline in India in this rapidly expanding and advancing research field. Figure 2 indicate a continuous rise in nanotechnology publications in water sector applications since 2000 (3408) to 2013 (15421) indicates approximately four fold increase. India has much better reception of papers. Thus, this is one indication that Indian research is addressing important problems, advancing knowledge and making researchers take note of that. It can also be observed in Fig 3 that the position of top 10 players is changing since 2000 due to change in share of publications. China is continuously increase publishing in this field and surpassed the other comparator countries and became the one of the most prolific country by acquiring a global rank of 2nd in this field in year 2013. India is also showing the same trend and also surpassed its comparator countries since 2007 like Spain, Italy, France, England and South Korea and positioned itself among top ten prolific countries.

United States of America and China are the most prolific countries in research publications in this area and India is also emerging as a key player in the global publications in this area this indicates that India is capable to show its visibility among top ten
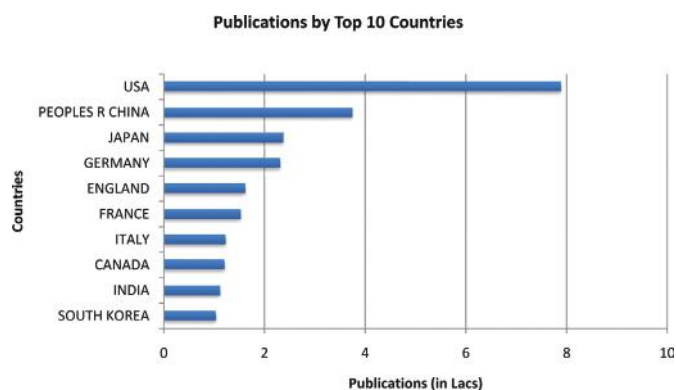

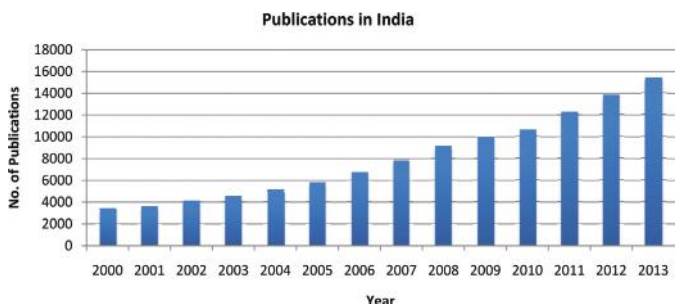**Figure 1. Top 10 Countries in nanotechnology water research publications (2000-2013).**

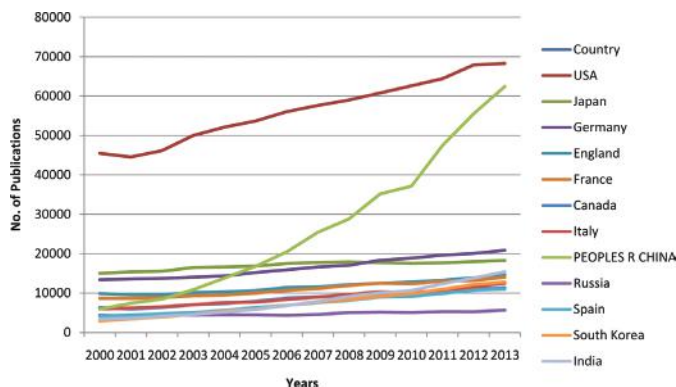**Figure 2. Publication trend in nano water research in India (2000-2013).**

Figure 3. Emergence of top 10 countries in nano water research from 2000-2013.

Table 1. Top institute involved in nano water research in India for the period 2000-2013

Institute	Publications	Percentage of total publications
Council of Scientific Industrial Research (CSIR)	16785	14.883%
Indian Institutes of Technology (IITS)	15696	13.918%
Indian Institute of Science (IISc) Banglore	4260	3.777%
Bhabha Atomic Research Center (BARC)	3798	3.368%
Banaras Hindu University (BHU)	2296	2.036%
University of Delhi	2110	1.871%
Jadavpur University	2041	1.810%
Anna University	1884	1.671%
Aligarh Muslim University	1568	1.390%
University of Calcutta	1287	1.141%

countries. India positioned itself at 5th after leading countries like USA, China, Germany and Japan. It is showing India is continuously working on pressing concern for economic development and to develop sustainable path to achieve quality water. Approximately 200 percent increment has shown for the period from 2000 to 2013. In 2000 India was not among top 10 leaders butin 2013 India is among the top 5 leaders. Overall, if we looked at the total publications from 2000-2013 India is able to make its visibility among top 10 countries (9th position), Fig. 1.

Council of Scientific Industrial Research (CSIR) and Indian institute of Technologyboth emerge as a major leader in publication and approximately contribute 15% and 14% respectively. IISc, BARC, BHU and University of Delhi are also actively publishing their paper.

It has been almost more than 10 years since India took major drive to create an innovation climate for nanotechnology by providing substantial funding. As a result of this, several institutes, Centre of excellence in nanotechnology established. They are continuously working on specific pressing concern. So it is an opportune time to assess the impact and influence publications and research have had on the field, as well as the greater scientific community. Citation count is a useful metric of scientific impact. It is the most common method for analyzing the magnitude of scientific recognition of an individual article. We have seen that India is continuously publishing on nanotechnology application in water sector and successful to receive attention from their international counterparts. Table 2 presents lists of top 15 countries and number of influential academic journal articles drawn from the Web of Science index based on citation count in year 2013. India is able to position itself in top 15 countries and receiving good citations for publication. Although citation index is not a direct measure of quality or importance, it offers one form of quantitative assessment of scientific impact. This assessment contributes to the identification of trends, which illustrate the evolution of scope and focus of nanotechnology research.

CSIR and IIT continuously taking lead in publishing effective publications in various web of science subject categories. In 2013, 80 papers were in top 1% cited papers of which 30 papers were from CSIR and IITS. Thus both of institutes contribute approximately 37% in quality research. Major subject categories in which IndianInstitutes are publishing are chemistry multidisciplinary, medicine General,

Table 2. 2013 Top 1% cited papers

Country	No. of Publications
Usa	1352
Peoples R China	816
Germany	333
England	308
France	210
Japan	175
Canada	175
Australia	163
Italy	154
Spain	150
South Korea	150
Netherlands	144
Switzerland	130
Singapore	125
India	80

Table 3. Publications by Indian Institutes in 2013 in top 1% cited papers

Institute	No. of Publications
Council of Scientific Industrial Research (CSIR)	15
Indian Institutes of Technology (IIT)	15
Indian Institute of Science (IISc) Banglore	5
Indian Association For The Cultivation Of Science (IACS) Jadavpur	4
All India Institute of Medical Sciences (AIIMS)	3
Publ Hlth Fdn India	3
WHO	2
University of Mumbai	2
Tata Institute of Fundamental Research	2
Natl Inst Pharmaceut Educ Res	2
Maulana Azad National Institute of Technology Bhopal	2
Jawaharlal Nehru Center for Advanced Scientific Research	2

Table 4. Subject categories

Web of Science Subject Categories
Chemistry Multidisciplinary
Medicine General Internal
Nanoscience Nanotechnology
Multidisciplinary Sciences
Materials Science Multidisciplinary
Pharmacology Pharmacy
Physics Applied
Physics Atomic Molecular Chemical
Chemistry Physical
Environmental Sciences

Nanoscience nanotechnology, Environmental Science, etc (table 4).

Water treatment and remediation has already been cited as one of the critical area where nanotechnology applications might aid developing countries like India.

In India, research is mainly focus produced such nanotechnology based technology which can serve the people at bottom of pyramid. They are mainly focusing on develop decentralised or point of use system that do not requires electricity Zero electricity• Minimum maintenance and low-cost of annual replacement (< INR 450/-) (<$10) like Aqua sure from Eureka for Ltd; and Pureit from Hindustan Liver limited, etc. (Table 5). Some of companies are also looking community based treatment units like removal of specific contaminants like fluoride and Arsenic.

Table 5. Major companies launched the water purifier are listed here

Company	Brand name	Capacity	Prices	Technology
Kenstar Appliance India	Biopure	18 Litre	Rs.2995/-	Micro Polyvinyl acetate (PVA) and ceramic Pre-filters are combined with Nano Silver Ceramic Balls
Tata Consultancy Services (TCS) and Titan Industries, Tata Chemicals	Tata Swach	7,15 and 18	Rs.499-999	Rice Husk Ash (RHA) 40 impregnated with Nano Silver particles.
Eureka Forbes	Aqua guard Total Gold Nova		Rs.9,500	Nano-silver activated carbon block
Hindustan Unilever	Pureit	15 litres	Rs.2000	nanosilver-coated
SBP Aquatech Pvt. Ltd. Hyderabad	Puritech	-	-	nanosilver-coated ceramic candle filters

2. CONCLUSION

Science Citation Index Database has a great importance to find out evolution, trend and progression of emerging technologies. Web of Science allow lookingforward/backward in time. It allows researcher to track the development of a technology, which may be the basis to decide effective future direction for road mapping of nanotechnology application using information on other organizations and authors potentially for collaboration, and identifies publications that cover similar topicsthrough citation tracking. Although, database alone is not inclusive but can provide the basis to find out the emerging area for research

निष्कर्ष

साइंस साइटेशन इंडेक्स डेटाबेस उभरती प्रौद्योगिकियों के विकास, प्रवृत्ति और प्रगति का पता लगाने के लिए अत्यधिक महत्वपूर्ण है। विज्ञान वेब (वेब ऑफ साइंस) समय में आगे ⁄ पीछे देखने की गुंजाइश रखता है। इसके माध्यम से अनुसंधानकर्ता ऐसी प्रौद्योगिकी के विकास पर नजर रख सकता है, जो अन्य संगठनों के संबंध में सूचनाओं का उपयोग करके नैनोटेक्नॉलजि अनुप्रयोग की रूपरेखा तैयार करने के लिए प्रभावी भविष्यगत दिशा का निर्धारण करने के लिए आधार बन सकती हैं, और यह उनसे सहयोग की संभावना को उत्पन्न करता है, और दृष्टांतों पर सतत नजर रखकर उन प्रकाशनों की पहचान करता है जो समान विषयों से संबंधित होते हैं। यद्यपि, यह डेटाबेस अकेले सर्वसमावेशी नहीं है, बल्कि यह उभरते अनुसंधान क्षेत्र का पता लगाने के लिए एक आधार प्रदान कर सकता है।

REFERENCES

1. Balzani, V. Nanoscience and Nanotechnology: Bottom up approaches to construct molecular device and machines. *Pure and Applied Chemistry*, 2000, **80** (8), 1631-1650.
2. Youtie J.; Iacopetta M. & Graham S. Assessing the nature of nanotechnology: Can we uncover an emerging general purpose technology? *Journal of Technology Transfer*, 2008, **33**, 315–329.
3. Graham, S. J. H. & Iacopetta M. Nanotechnology and the Emergence of a General Purpose Technology, 2009. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1334376 (accessed 10 September 2014).
4. Bresnahan T. F. General purpose technologies. In: B. H. Hall and N. Rosenberg (eds). Handbook of Economics of Innovation, 2010, **2**, 761–791.
5. Bhattacharya S.;Shilpa & Bhati M. China and India: The Two New Players in the Nanotechnology race. *Scientometrics*, 2012, **93** (I), 59-87.
6. Mowat F. S. & Tsuji J. S. Nanotechnology and the Water Market: Applications and Health Effects. 9th Annual National Standards and Technology Institute (NSTI) Nanotechnology Conference and Trade Show, 2006, **2**, 416-419.

अंतरराष्ट्रीय सम्मेलन "विश्व की प्रगति में विज्ञान तथा प्रौद्योगिकी का योगदान" में प्रस्तुत पत्रों का एक बिब्लोमेट्रिक अध्ययन

A Bibliometric Study of Papers Presented at the International Conference on *Vishwa ki Pragati Mein Vigyan tatha Prodyogiki ka Yogdan*

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सारांश

डिफेन्स साइंटिफिक इन्फॉर्मेशन एंड डॉक्यूमेन्टेशन सेन्टर (डेसीडॉक), दिल्ली द्वारा आयोजित विश्व की प्रगति में विज्ञान तथा प्रौद्योगिकी के योगदान से संबंधित अंतरराष्ट्रीय सम्मेलन में प्रस्तुत 660 पत्रों का विश्लेषण दर्शाता है कि इस सम्मेलन में सबसे बड़े योगदानकर्ता शैक्षणिक संस्थान थे जिनके बाद रक्षा अनुसंधान और विकास संगठन का स्थान था। अधिकतर पत्र भारतीय लेखकों द्वारा प्रस्तुत किए गए और कुछ पत्र भारतीय लेखकों के सहयोग से विदेश से थे। राज्यों में दिल्ली ने सबसे अधिक योगदान दिया जिसके बाद उत्तर प्रदेश का स्थान रहा। दिल्ली ने योगदानकर्ता नगरों की सूची में भी सबसे शीर्षस्थ स्थान प्राप्त किया। संस्थाओं में डेसीडॉक ने सर्वाधिक संख्या में योगदान दिया। अधिकतर पत्र एकल लेखक के थे और महिला योगदानों का हिस्सा कुल लेखकों में लगभग 25 प्रतिशत था।

ABSTRACT

An analysis of 660 papers presented at the international conference on the role of science and technology in global development organized by Defence Scientific Information and Documentation Centre (DESIDOC), New Delhi, indicates that academic institutions were the largest contributors to the conference followed by Defence Research and Development Organization. Most of the papers were contributed by Indian authors with a few from abroad in collaboration with Indian authors. Among the states Delhi made the highest contributions followed by Uttar Pradesh. Delhi also topped the list of contributors among the cities. Among the institutions, DESIDOC made the highest number of contributors. Most of the papers were single authored and the share of women contributions was about 25 per cent of the total authors.

Keywords: Bibliometric, DESIDOC, international conference

1. INTRODUCTION

Researchers use different channels of information sources to publish their research findings and conference proceedings is one such channel. Conference proceedings are defined "as official record of the things said and done at a conference or meeting"[1]. These are usually made available as a booklet or a CD-ROM containing the versions of the papers delivered at a particular conference. Conferences bring new knowledge to the attention of the research community. These are considered as major source of primary information on cutting edge research and development; particularly in the fields of science, engineering, and technology in addition to journal papers. According to Drott[2],

conference proceedings serve three specific functions. First, they help researchers to improve their papers by allowing the latter to gather feedback from other researchers before submitting the presented paper to a journal. Second, they stimulate discussion within a field by allowing researchers to exchange ideas on emerging questions. Third, they can be a vehicle for information that would otherwise be difficult to include in an article.

Several conferences are held in different areas of science, engineering, and social sciences every year in different parts of the globe. However, these conferences vary in size and quality as several of the papers presented at these conferences are not peer-reviewed.

2. ABOUT THE CONFERENCE

An international conference was organized by Defence Scientific Information and Documentation Centre (DESIDOC), Delhi, of the Defence Research and Development Organization (DRDO) from 5 to 7 December 2013 on the topic "*Vishwa ki Pragati mein Vigyan tatha Prodyogiki ka Yogdan*" (The Role of Science and Technology in Global Development). The medium of communication of the conference was Hindi, because the aim of the conference was to spread the use of Hindi in the promotion of science and technology. About 700 articles/research papers were received from scientists/educationists from 20 countries scattered in different parts of the globe. Of these 660 were accepted for oral or poster presentation.Of the 660 accepted papers, 292 were verbal presentations and 368 poster presentations. The conference was attended by 850 delegates from India and 40 delegates from abroad.

The papers presented at the conference were published in 11 edited books. The titles of these books along with number of papers included in each are as follows:
1. Scientific Research (47 papers);
2. Contemporary Scientific Research (45 papers);
3. Scientific Research and Development (46 papers)
4. Contemporary Science (48 papers);
5. Role of Science and Technology in Global Development (50 papers);
6. Science (54 papers);
7. Science Communication (45 papers);
8. Information Science (48 papers);
9. Hindi in Today's India (62 papers);
10. Present Scientific Research (47 papers);
11. Science and Culture (49 papers);
12. Number of Abstracts (119)

3. REVIEW OF LITERATURE

Several studies dealing with bibliometric and citation analysis of individual journals are available in literature[3-6]. However, only a few studies dealing with bibliometric analysis of the conference proceedings have appeared in the literature. For instance, Glanzel *et al*[7] points out that taking conference proceedings into account in bibliometric studies produces a more complete and hence, precise picture of a given discipline's scientific production. Wong[8] gave the critical importance of conference proceedings in his correspondence to Nature Magazine by giving reference to two papers which were originally published in conference proceedings and later the authors went on to win the Nobel Prize for Physics in 1979 and Noble Prize for Chemistry in 2002. Shamir[9] points out that in the disciplines of computer science and engineering, a vast majority of the peer-reviewed publications are in the form of conference proceedings and reviewed the differences between computer science and engineering conference publications and the traditional journals used in other scientific disciplines, discussing the effect of these differences on the scholarly communication in these fields. Lisee, Lariviere and Archambault[10] examined the scientific impact and aging of conference proceedings in comparison to other forms of scientific literature and found that the scientific impact of proceedings is losing ground to other types of scientific literature in nearly all fields, but it has grown from 8% of the references in engineering papers in the early 1980s to 10% in recent years. Proceedings play a particularly important role in computer sciences, where they account for close to 20% of the cited references.

4. OBJECTIVES

Following are the objectives of the study:
- To examine the distribution of contributions by performing sectors;
- To examine the geographical distribution of contributions by Indian states and cities;
- To examine the distribution of contributions by institutions;
- To examine the pattern of authorship of the papers presented and their distribution by gender.

5. DATA AND METHODOLOGY

The source of data for the study was 660 papers that were presented orally or as posters at the above mentioned international conference organized by DESIDOC, Delhi, from December 5-7, 2013. Since Hindi was the medium of communication of the conference, the first step was to translate the bibliographic information into English. The translated data was fed into MS-Excel for analyzing the bibliographic records. The several parameters fed into the MS-Excel sheet were the number of authors, gender of contributing authors, name of the contributing institutions and the agency to which it belonged, their regional distribution by state and city. All the collected data were tabulated and analyzed to meet the objectives mentioned above. We have used the method of complete counting in which all contributing authors or institutions have been given a unit credit. This helps in getting the total number of participating institutions and authors. However, this results in inflation of data relating to the total number of authors and institutions than the actual number of papers. In the present case also the total has inflated to 795, while the actual number of papers was 660.

6. RESULTS AND DISCUSSION

6.1 Distribution of Contributions by Performing Sectors or Agencies

Since independence India has developed a vast infrastructure for science and technology, several agencies are involved in scientific research in India. These are universities and institutes of higher learning like Indian Institutes of Technology (IITs), engineering colleges, medical colleges and hospital. Besides these, government funded laboratories under the aegis of different performing sectors like the Council of Scientific and Industrial Research (CSIR), Department of Atomic Energy (DAE), Department of Science and Technology (DST), Department of Biotechnology (DBT), Defence Research and Development Organization (DRDO), Indian Council of Agriculturel Research (ICAR), and Indian Council of Medical Research (ICMR), etc contribute to Indian scientific output. Analysis of data on the distribution of contributions according to different performing sectors is given in Table 1. It indicates that like scientific output, academic institutions (universities and colleges) were the highest contributors (32.2 per cent) to the total papers discussed at the conference[11]. This was followed by contributions from DRDO (19.6 per cent),the sponsoring agency of the conference, engineering colleges (9.8 per cent), ICAR (8.6 per cent), and IITs (5 per cent). The share of these five performing sectors is approximately three-fourth of the total papers discussed at the conference.

Table 1. Distribution of contributions by performing sectors

Name of performing sector	# of contributions
Academic Institutions	256
Defence Research and Development Organization	156
Engineering Colleges	78
Indian Council of Agriculture Research and SAUs	68
Indian Institutes of Technology (IITs)	40
Ministries under the central Government	24
Council of scientific and Industrial Research	21
Department of Space	14
Medical Colleges	9
Department of Atomic Energy	8
Department of Science and Technology	5
Individual and others	70
Others not identified	46
Total	**795**

6.2 Distribution of Contributions by Country and Indian States

The analysis of data by institutional affiliation of authors indicates that 660 papers were contributed by authors from abroad as well as from India. The contributions from abroad were scattered among 17 nations. Among the authors from abroad, highest (10) contributions were from the USA followed by UK (5), Italy (3) and Australia and New Zealand contributing two papers each. Most of the contributions made by authors from abroad were in collaboration with Indian authors.

Table 2 depicts the distribution of contributions by Indian states. Of all the states, highest (30%) contributions came from Delhi/New Delhi, followed by Uttar Pradesh (14%) and Haryana (11%). These three states together contributed more than half (~ 55%) of the total papers. Remaining 45% papers were contributed by other states. Further analysis of data depicted in Table 2 indicates that 77% of the contributions, as expected were made by Hindi speaking states. However, the share of Bihar among the Hindi speaking states was very less. Among the non-Hindi speaking states, Maharashtra,Karnataka and Gujrat contributed the highest number of papers.

Table 2. Distribution of contribution according to the indian states

Name of state	No of contributions
Delhi/New Delhi	236
Uttar Pradesh	114
Haryana	87
Madhya Pradesh	49
Maharashtra	39
Rajasthan	37
Chhattisgarh	35
Uttarakhand	28
Karnataka	23
Gujarat	22
Andhra Pradesh	12
Punjab	11
Jharkhand	10
Tamil Nadu	09
Jammu and Kashmir	08
West Bengal	07
Bihar	06
Total	**733**
Other Indian States	14
States not identified	13
Grand Total	**760**
Contributions from abroad	35
Grand Total	**795**

6.3 Distribution of Contributions by Indian Cities

The total presentationscame from 122 cities located in different parts of India.Table 3 depicts the distribution of contribution by city. Highest (236) number of contributions came from institutions located in Delhi/New Delhi, the venue of the conference. Also the contributions made by authors from Delhi/New Delhi are more than the total contributions (201) made by other cities listed in Table 3. Thus, the cities listed in Table 3 contributed about 55% of the papers presented at the conference. Remaining 45% contributions came

Table 3. Distribution of Contribution according the Indian cities.

Name of city	No of Contributions
Delhi/New Delhi	236
Jhajjar	24
Pune	22
Ahmadabad/Gandhinagar	21
Lucknow	19
Rohtak	19
Raipur	17
Varanasi	17
Bangalore	15
NOIDA/Greater NOIDA	14
Bahadurgarh	13
Dehradun	10
Jaipur	10
Other 109 Cities	358
Total	795

from other 109 cities. Thus, it can be stated that more than half of the presented contributions were made only by 13 cities. All these cities were located in the Hindi speaking states except Pune, Ahmadabad/Gandhi Nagar and Bangalore which are located in non Hindi speaking states.

6.4 Distribution by Contributing Institutions

An analysis of data on contributing institutions indicate that the total output came from 293 academic and research institutions located in different parts of India and world. Table4 lists top seven institutions which contributed 9 or more papers.These seven institutions contributed 162 (21%) of the papers discussed at the conference. The remaining 633 (79%) of the papers were contributed by 260 institutions located in different parts of the country. Among these institutions, as many

Table 4. Distribution of contributions by institutions

Institution	# of papers
Defence Scientific Information and Documentation Centre, Delhi	69
Indian Institute of Technology, Delhi	33
Ganga Institute of Technology and Management, Jhajjar	24
PDM college of Engineering, Bahadurgarh	12
Institute of Nuclear Medicine and Allied Sciences, Delhi	11
Pandit Ravi Shankar Shukla University, Raipur	09
Banaras Hindu University	09
Total	**167**
Other 286 institutes	628
Grand Total	**795**

as 188 institutions contributed only one paper and the rest 72 contributed two to eight papers. Among the top seven institutes, the highest (69) were contributed by DESIDOC, the organizing institute. The share of DESIDOC was about 8.5% of the total contributions. It was also noticed that of the 660 papers, 51 papers were contributed by individual authors who were not associated with any institutions and collaborated with authors from some other institutions.

6.5 Authorship Pattern of Contributions

Studies of authorship pattern mainly deal with the kind of authors and the pattern of collaboration among them. An author may publish a paper independently or he may collaborate with one or more number of authors to bring out a publication. In recent years maximum research is being carried out in collaboration. The extent of collaboration depends on the number of participants involved in the work. Collaboration is high in science, technology and medicine than that in social sciences and humanities. For the present study, the publication data was grouped into four categories. These were single authored, two authored, multi-authored (papers with 3 or 4 authors) and mega authored papers (papers with > 4 authors). Table 5 gives the details about the authorship pattern. It indicates that more than half of the presentations made were single authored, followed by two authored contributions. The share of mega authored papers was the least. Further analysis of data indicates that there were eight authors in three papers and nine authors in two papers. Thus, analysis of authorship of contributions reveals that contributions of single author papers are more than those with two or multi or mega authored papers.

Data was also analyzed to identify the contributions made by female authors. Total 660 papers were contributed by 1278 authors. Of these 322 (25.2%) were female

Table 5. Authorship pattern of contributions

No. of author(s)	Total no. of contributions	Percent
Single-authored papers	339	51.4
Two-authored papers	161	24.4
Multi-authored papers (3 and 4 authors)	129	19.5
Mega-authored papers (more than 4 authors)	31	4.7
Total	660	100

authors and the rest 956 (74.8%) were male authors. Thus, the data indicates that a significant number of female authors are involved in popular science writing in Hindi. Highest (37) number of female authors were in the category of contemporary science followed by role of science and technology in global development (32) and present scientific research (31).

7. CONCLUSION

The international seminar on "The Role of Science and Technology in Global Development" organized by Defence Scientific Information and Documentation Center (DESIDOC) of the Defence Research and Development Organization (DRDO) from 5 to 7 December 2013 received 700articles/research papers from 20 different countries. Of these, 660 were selected for oral or poster presentation. The present bibliometric analysis of the conference papers indicates that academic institutions (universities/colleges) contributed the highest number of papers followed by Defence Research and Development Organisation. The share of these two performing sectors was about 52% of the total contributions. Analysis of geographical distribution of contributions shows that scientists from abroad contributed 35 papers and the rest were contributed by scientists from India. Among the states Delhi made the highest contributions followed by the state of Uttar Pradesh and Haryana. Among the cities also Delhi's share was highest followed by Jhajjar and Pune.

Most of the contributions were made by Hindi speaking states. However, Maharashtra, Karnataka and Gujrat were three non Hindi speaking states that contributed significantly. Among the institutions, Defence Scientific Information and Documentation Centre, the organizer of the seminar made the highest number of contributions followed by contributions from IIT Delhi and Ganga Institute of Technology and Management. The pattern of authorship indicate that about half (51.4%) of the papers were single authored. Women scientists authored about 25% papers and the rest were contributed by male scientists. Among the subjects highest 62 number of papers were presented on the topic of Hindi in Today's India.

निष्कर्ष

रक्षा अनुसंधान और विकास संगठन के डिफेन्स साइंटिफिक इन्फॉर्मेशन एंड डॉक्यूमेन्टेशन सेन्टर द्वारा "विश्व की प्रगति में विज्ञान तथा प्रौद्योगिकी का योगदान" विषय पर दिनांक 5 से 7 दिसंबर, 2013 तक आयोजित अंतरराष्ट्रीय संगोष्ठी में 20 भिन्न–भिन्न देशों से 700 लेख/शोध पत्र प्राप्त हुए। इनमें से 660 मौखिक या पोस्टर प्रस्तुति के लिए चयनित हुए। सम्मेलन में प्रस्तुत पत्रों का वर्तमान बिबलियोमेट्रिक अध्ययन दर्शाता है कि सर्वाधिक संख्या में पत्रों के सबसे बड़े योगदानकर्ता शैक्षणिक संस्थान (विश्वविद्यालय/महाविद्यालय) थे जिनके बाद रक्षा अनुसंधान और विकास संगठन का स्थान था। इन दो कार्यनिष्पादक क्षेत्रों का हिस्सा कुल योगदानों में लगभग 52% था। योगदानों के भौगोलिक वितरण का विश्लेषण दर्शाता है कि विदेश की वैज्ञानिकों ने 35 पत्र प्रस्तुत किए और शेष पत्र भारत के वैज्ञानिकों द्वारा प्रस्तुत किए गए। राज्यों में दिल्ली ने सर्वाधिक योगदान दिया जिसके बाद उत्तर प्रदेश और हरियाणा राज्यों का स्थान रहा। नगरों में भी दिल्ली का हिस्सा सबसे अधिक था जिसके बाद झज्जर और पुणे का स्थान रहा। अधिकतर योगदान हिंदी भाषी राज्यों द्वारा दिए गए। किंतु, महाराष्ट्र, कर्नाटक और गुजरात तीन ऐसे गैर–हिंदी भाषी राज्य थे जिन्होंने महत्वपूर्ण योगदान दिया। संस्थाओं में, संगोष्ठी के आयोजक डिफेन्स साइंटिफिक इन्फॉर्मेशन एंड डॉक्यूमेन्टेशन सेंटर ने सर्वाधिक संख्या में योगदान दिया जिसके बाद आईआईटी, नई दिल्ली और गंगा प्रौद्योगिकी और प्रबंधन संस्थान का स्थान रहा। लेखन का पैटर्न दर्शाता है कि लगभग आधे पत्र (51.4%) एकल लेखकों के थे। महिला वैज्ञानिकों ने लगभग 25% पत्र लिखे और शेष पुरुष वैज्ञानिकों द्वारा प्रस्तुत किए गए। विषयों में, सर्वाधिक 62 पत्र आज के भारत में हिंदी के विषय पर प्रस्तुत किए गए।

REFERENCES

1. Ali, A. Ane's Encyclopedic Dictionary of Library and Information Science, Vol.1, New Delhi, Ane Books India (2006) 206.
2. Drott, C.M., Re examining the role of conference papers in scholarly communication, *Journal of the American Society for Information Science*, 1995, 46(4), 299–305.
3. Kumar, A., Prakasan, E. R., Kalyane, V. L., Kumar, V., Pramana: A journal of physics, *Annals of Library and Information Studies*, 2008, **55**(1), 52-61
4. Garg, K. C., Sharma, P., Kumar, S., Scientometric profile of the journal Mausam, *Annals of Library and Information Studies* 2008, **55**(1),76-80
5. Kumar, M., Moorthy, A.L. Bibliometric Analysis of DESIDOC Journal of Library and Information Technology during 2001-2010. *DESIDOC J. Lib. & Inf. Technol.*, 2011, **31**(3), 203-08
6. Garg, K.C., Anjana, A.K. Journal of Intellectual Property Rights: A bibliometric study, *DESIDOC*

J. Lib. & Inf. Technol., 2014, **34**(1), 66-73

7. Glänzel, W., Schlemmer, B., Schubert, A., & Thijs, B. Proceedings literature as additional data source for bibliometric analysis. *Scientometrics*, 2006,68(3), 457–473.

8. Wong Min-Liong. What other treasure could be hidden in conference papers? *Nature*, 2008, **456**(7226), 443.

9. Shamir, L. The effect of conference proceedings on the scholarly communication in computer science and engineering. *Scholarly and Research Communication*, (2010), **1**(2) available at www.

src-online.ca retrieved on 15 October 2014.

10. Lisee, C., Lariviere, V., and Archambault, E. Conference proceedings as a source of scientific information, *Journal of the American Society for Information Science and Technology,*2008, **59**(11),1776–1784

11. Garg, K.C., Dutt, B., and Kumar, S. Scientometric profile of Indian science as seen through Science Citation Index. *Annals of Library and Information Studies*, 2006, **53**(3) 114-125.

फल विज्ञान में एम.एस–सी थीसिस का वर्णनात्मक अध्ययन
Descriptive study of M.Sc. Thesis in Fruit Science

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सारांश

यह पत्र बागबानी महाविद्यालय, मंदसौर (म प्र) में फल विज्ञान विभाग में एम एससी थीसिस के वर्णनात्मक अध्ययन से संबंधित है। यह विषय शोधार्थियों के बीच बहुत लोकप्रिय है। अध्ययन अवधि वर्ष 2008 से 2014 तक कुल 7 वर्ष है जिसमें 32 एम एस सी थीसिस शामिल हैं। के एन के बागबानी महाविद्यालय, मंदसौर के फल विज्ञान विभाग में जमा की गई थीसिसों में से आंकड़ें एकत्र किए जा रहे हैं। मामला अध्ययन को अध्यक्ष–वार, वर्ष–वार, लिंग–वार और फल–वार, इत्यादि विश्लेषित किया गया है।

ABSTRACT

This paper deals with the descriptive study of M.Sc. theses in Department of Fruit Science at College of Horticulture, Mandsaur (MP).This subject is very popular among the research scholars. The study period is totally 7 year from 2008 to 2014 covering 32 M Sc theses. Data is being collected from the theses submitted in the Department of Fruit Science of K N K College of Horticulture, Mandsaur. The case study has been analyzed subjected are chairman-wise, year-wise, gender-wise and fruit-wise, etc.

Keyword: Fruit science, bibliometric, theses/dissertations, research

1. INTRODUCTION

According to Gorman and Clayton, "Research is a process of enquiries that draws from the context in which events occur, is an attempt to describe these occurrences, as a mean of determining the process in which event are embedded and the perspective of those participating in the events, using induction to derive possible explanation based on observed phenomena. It is the continuous process for the advancement of that field. So the main purpose of this study is to analyze the samples with the application of quantitative and statistical techniques of bibliometrics research is carefully investigation to find out new facts and new knowledge.

Research is defined in various ways. Some consider research as o movement or progress from the known to the unknown. Slesinger and Stephenson define research as "the manifestation of things, concepts or symbols for the purpose of generating to extend, correct or verify knowledge wither that knowledge aids in construction of theory or in the practice of an art." Research leads to solutions to problem that the professionals confront in their work.

1.1 Bibliometric

Bibliometrics is the application of quantitative techniques to analyze the volume, the movement, the frequency and the characteristics, etc of published documents and the related activities. Alan Pritchard was first to use the word "Bibliometrics" in an article "Statistical Bibliography or Bibliometrics" published in the 1969 issue of the "Journal of Documentation". He defines Bibliometrics as "the application of mathematical and statistical methods to books and other media of communication." In a later article, Pritchard explained Bibliometrics as the "metrology of the information transfer process and its purpose is analysis and control of the process".Bibliometrics is a set of methods used to study or measure texts and information (Wikipedia, 2011).

1.2 Methodology

The data needed for the application of Bibliometric Analysis was collected from the print version of database prepared from the thesis submitted to the Library, College of Horticulture, Mandsaur (M.P.). The data has been presented in the tabulation and graphical form.

2. OBJECTIVES OF THE INVESTIGATION

- To know the quantitative growth of M.Sc. these in Fruit Science.

- To knows the major fruit of research over a period of 7 years.
- To find out year wise distribution.
- To find out gender wise research productivity.

3. COLLEGE OF HORTICULTURE, MANDSAUR

The College of Horticulture Mandsaur was known as College of Agriculture before year of 1987-2002 ,It is converted into K.N.K.College of Horticulture Mandaur on October 4, 2002 .The college imparts education at UG and some PG level courses. The total capacity of UG level is of 56 and PG level is available in 6 department viz, Fruit Science, Floriculture and Landscaping, Medicinal and Aromatic Plant, Plantation and Spice Crops, Post-Harvest Management and Vegetable Science, In addition to normal seats in PG and UG programmes, Payment seats NRI seats and ICAR seats are also available as per rules Good facility of library, laboratories girls and boy hostels and also sports are available at this college.

4. ANALYSIS AND INTERPRETATION OF DATA

This study reveals that 134 M.Sc. degrees have been awarded so for to professional in the field of Horticulture by College of Horticultuture, Mandsaur (M.P.) among them, 32 research studiesof M.Sc. degree awarded to Fruit Science department.

It is obvious from the said data that among the horticultural subjects, the percentage of theses submitted in Fruit Science Department is 23.88.

Year-Wise Distribution:Total 32 M.Sc. theses/ dissertations have selected for the study. The following table presents the year-wise distribution (chronological) of samples. The data shows year wise distribution of M.Sc. these of 32research scholars. The highest number of theses submitted in the year of 2013& 2014 followed by year 2011 & 2012. The third position goes to the year of 2008 & 2009. The least position goes to the year of 2010.

Gender-Wise Distribution: Table 3 shows the Gender-wise distribution of the Horticulture M.Sc. theses/dissertations. Table depicts that 28 of male candidates and 04 are found occupied by female candidates.This table shows that the highest number of male and female theses submitted in the year 2013 and 2014 were 6 male and 1 female theses submitted, The Second highest number of theses submitted in

Table 1.Total theses of all subjects of fruit science

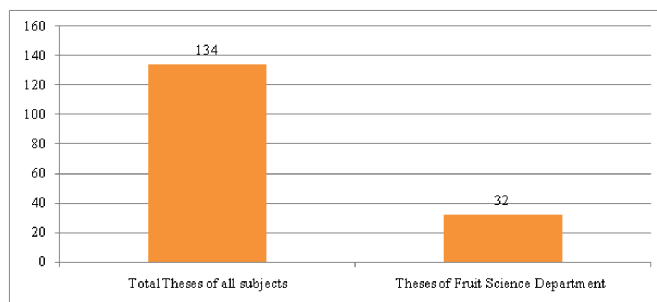| Total theses of all subjects	Theses of fruit science department	%
134	32	23.88

Figure 1. Total theses of all subject and fruit science.

Table 2. Year wise distribution of MSc theses

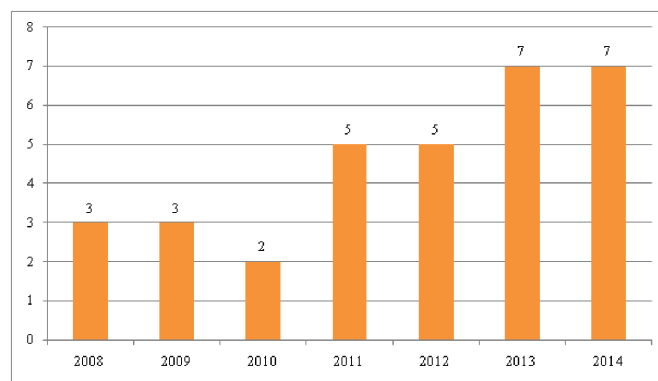| Year	No. of Theses	Rank
2008	3	III
2009	3	III
2010	2	IV
2011	5	II
2012	5	II
2013	7	I
2014	7	I
Total	32	

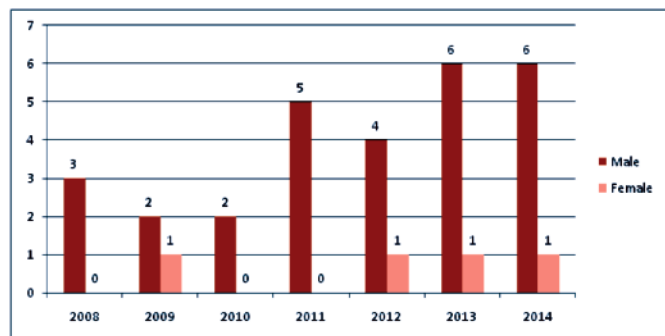**Figure 2. Year wise distribution of MSc theses**

the year 2011 were 4 male and Nil female, The third position goes to the year 2012 were 4 male and 1 female, The fourth position goes to the year 2008were 3 male and nil female, The lowest number of theses submitted during the year 2010.

Guide-Wise Distribution:Guide-wise distributions of M.Sc. theses/dissertations are shown in table 4. This table indicates that overall 02 guides guided 32 M.Sc. research scholars. As is evident from the table that 62.5% case studies guided by Dr.Dr.RajeshTiwari and 37.5 % theses guided by Dr R N Kanpure, at college of Horticulture, Mandsaur (M P).

Fruit Types-wise distribution:It is evident from the said data that guava exhibited the higher percentage (43.7) followed by Ber and Citrus (12.5). The next papaya exhibited position goes to Aonla, Grape and Pomegranate, as compared to all the fruits used by research scholars.

Table 3. Total no. of male and female research scholars

Year	Male	Female	Total
2008	3	-	3
2009	2	1	3
2010	2	-	2
2011	5	-	5
2012	4	1	5
2013	6	1	7
2014	6	1	7
Total	28	4	32

Figure 3.Total no.of male and female research scholars.

Table 4. Chairman-wise distribution of M.Sc. theses

Name of Chairman	No. of Theses	Percentage
Dr.Rajesh Tiwari	20	62.5
Dr. R.N.Kanpure	12	37.5
Total	32	100
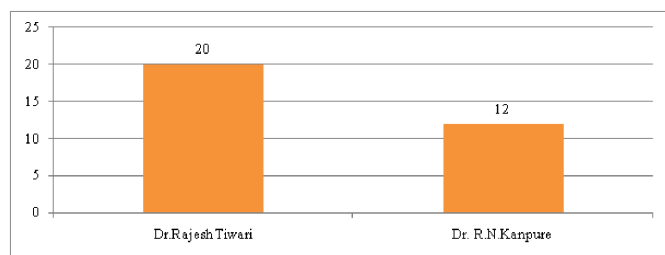
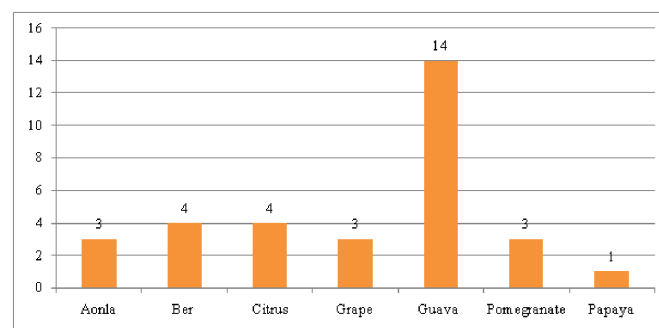**Figure 4. Chairman-wise distribution of M.Sc. theses.**

5. CONCLUSION

The study shows the detail of M.Sc. theses by using analytic study of College of Horticulture Mandsaur. It is clear from the study that 32 these were awarded by the College of Horticulture Mandsaur (M P). Their topic were 14 related to fruit Guava (*Psidium guajava L.*) is the first choice of the researcher i.e. and Ber (*Zizyphus Mauritiana L.*), Citrus are second choice of the students and male are interested is the fruit science department is highest.

निष्कर्ष

यह पत्र बागबानी महाविद्यालय, मंदसौर (म.प्र.) का विश्लेषणात्मक अध्ययन करके एम एससी थीसिस का विवरण दर्शाता

Figure 3.Total no.of male and female research scholars.

Fruit type	No. of These	Percentage
Aonla(Emblicaofficianlis gaerth)	3	9.4
Ber (Zizyphus Mauritiana L.)	4	12.5
Citrus	4	12.5
Grape (Vitis vinifera L.)	3	9.4
Guava(Psidium guajava L.)	14	43.7
Pomegranate(Punica granatum L.)	3	9.4
Papaya (CaricaPapaya L.)	1	3.1
Total	32	100

Figure 5. Fruit Types-wise distribution of M.Sc. theses.

है। अध्ययन से स्पष्ट है कि बागबानी महाविद्यालय, मंदसौर (म.प्र.) द्वारा 32 थीसिस को नवाजा गया। अमरूद (सिडियम गुआजावा एल.) से संबंधित 14 विषय और बेर (जिजाईफस मॉरिटियाना एल.) अनुसंधानकर्ताओं की पहली पसंद हैं, खट्टे (सिट्रस) फल विद्यार्थियों की द्वितीय पसंद हैं और फल विज्ञान विभाग में पुरूषों की रूचि सर्वाधिक पाई गई है।

REFERENCES

1. Arunima Kumari. An Introduction to Research Methodology. Udaipur: Agrotech Publishing Academy. 2008.

2. Kumar, P.S.G. Doctoral studies in library and information science in India: a study. *DESIDOC Bulletin of Information Technology*, 1998, **18**(1), 5-9.

3. Kumar, S. & Kumar, S. Bibliometric study of the journal of Oilseeds Research since (1993-2001). *SRELS Journal of Information Management*, 2005, **42**(3), 305-334.

4. Mishra, Devendra Kumar. Bibliometric Study of Ph.D. Thesis in English. *Global Journal of Academic Librarianship*. 2014, **1**(1), 19-36.

5. Patra, Swapan Kumar & Prakash Chand. Library and Information Science Research in India: A Bibliometric study. *Annals of Library and Information studies*, 2006, **53**, 219-223.

6. Sharma, Arvind K.. Importance and availability patterns of bilingual (Sanskrit-Hindi and Hindi-

Sanskrit) dictionaries: A bibliometric study. *Journal of Library and Information Technology*, 2005, **1**(2), 27-35.

7. Sharma, Ramnivas. Bibliometric and Citation Analysis of Ph.D. Theses in Library and Information Science 2001 to 2008. Gwalior: Jiwaji University. Ph.D. Thesis. 2012.

8. Sharma, Ramnivas. A New Concept of Indian Doctoral Dissertations. *GranthalayaVigyan,* 2012, 43, 26-35.

9. Sharma, Ramnivas. Electronic Thesis and Dissertations: Better Concept for Present to Future. UGC–Sponsored 2 Days National Conference on "Redesigning Libraries & Information Centers In Digital Era"(RLICDE) 26–27 December 2012, Degloor College, Degloor (M.S.). 2012.

10. Sharma, Ramnivas. Bibliometric Monitoring of Research Performance in the Hindi in Jiwaji University, Gwalior (1971-1990). *Research Discourse*, 2012, 2(2), 237-241.

11. Sharma, Ramnivas & Sharma, Arvind K. Bibliometric Monitoring of Research Performance in the Library and Information Science in Uttar Pradesh Universities (2001-2008). *Journal of Library Metamorphosis*, 2013, **1**(1), 32-43

12. Sharma, Ramnivas and Bharvey, Harish C. Bibliometric Study of M.Sc. Theses submitted in K.N.K. College of Horticulture, Mandsaur, RVSKVV, Gwalior (M.P.) during 2008-2012. *Journal of Information Technology and Library Science*, 2013, **1**(1), 43-56.

13. Sharma, Ramnivas and others. Bibliometric Monitoring of Research Performance in the field of Dairy Science with special reference to Krishiprabha. In Stanley Madan Kumar and others. Information Access in Digital Libraries. New Delhi: New Indian Publishing Agency. 2014.

14. Venugopal, M.V. and others, Ed. Vistas in Library, Information Systems and Networks. Agra: Y. K. Publishers. 1999.

15. Wikipedia (2011): http://en.wikipedia. org/wiki/ Bibliometrics.