

REPORT ON THE
INTERNATIONAL CONFERENCE ON DIGITAL LIBRARIES (ICDL) 2006
5-8 DECEMBER 2006

Organized

by

THE ENERGY AND RESOURCES INSTITUTE (TERI)
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REPORT ON THE INTERNATIONAL CONFERENCE ON DIGITAL LIBRARIES (ICDL) 2006

INTRODUCTION

The Second International Conference on Digital Libraries (ICDL) 2006 was held from 5-8 December 2006 at the India Habitat Centre, Lodhi Road, New Delhi. The Conference was inaugurated by Mr. Badal K Das, Secretary, Ministry of Culture, Government of India on 5 December 2006. Dr R K Pachauri, Director-General, TERI welcomed the participants and introduced ICDL 2006. Prof. N Balakrishnan, Professor and Associate Director, Indian Institute of Science, Bangalore, delivered the keynote address while Ms Minja Yang, UNESCO Representative to Bhutan, India, the Maldives, and Sri Lanka; and Director, UNESCO, New Delhi gave the special address. The vote of thanks was proposed by Mr Debal C Kar, Fellow, Library and Information Centre, TERI.

PARTNERS AND SPONSORS

Partners

2. The Ministry of Culture, Government of India was Partner of the conference. UNESCO, New Delhi; Department of Scientific and Industrial Research, Government of India; and Association for Computing Machinery (ACM SIGCHI), USA were Associate Partners of the conference. The Council of Scientific and Industrial Research (CSIR), Indian Council of Social Science Research (ICSSR), Indian National Science Academy (INSA), British Council Library, India and the Embassy of Austria also supported the conference.

Sponsors

3. The conference was sponsored by Blackwell Publishing, Global Information Systems Technology Pvt Ltd, Institute of Electrical and Electronics Engineers, Inc. (IEEE), Nature Publishing, Springer, Taylor & Francis, Indlaw Communications, Ankita Enterprises, Elsevier Science Publishers, Libsys, and Balani Infotech.

BACKGROUND

4. The Information and Communication Technology (ICT) revolution in the last decade has had drastic and far-reaching impacts on all aspects of human life, particularly on the knowledge and information sector. The Internet has added a new dimension to information technology, giving birth to rich concepts such as Digital Libraries (DLs), knowledge management, e-learning and archiving of indigenous culture and heritage. DLs and e-learning can help move the nation towards realizing the enormously powerful vision of anytime, anywhere access to the best and the latest of human thought and culture, so that no individual is isolated from knowledge resources. DLs and e-learning which bring the library to the user, overcoming all geographical barriers are, therefore, emerging as crucial components of the global information infrastructure. They adopt the latest ICT tools and techniques to promote an organizational structure that encourages communication between scholars across nations, and helps to transcend disciplinary boundaries.

5. Learning is an unending process. Knowledge, therefore, should reach the largest number of people for it to become a movement. Realizing this, the Prime Minister has constituted the National Knowledge Commission for the production, use, and dissemination of knowledge, which will help in promoting excellence in the education system to meet the knowledge challenges of the 21st century. Providing access to everyone in the country to knowledge available across the globe is one of the prime objectives of the Knowledge Commission.

6. Libraries, museums, and other service institutions are involved in preserving information related to culture and heritage. These institutions collect literature and artifacts and preserve them to facilitate future access and also disseminate knowledge and understanding of different times, peoples, and cultures. Multimedia DL allows such information to be integrated, recorded, browsed, and searched—all within a uniform user interface.

7. Realizing that a digital divide exists in India, several Ministries of the Government of India as well as institutions, NGOs, private bodies, and others have initiated national and regional level capacity building initiatives in ICTs, e-learning, DLs and knowledge management fields. TERI also made a contribution towards this by organizing the first ICDL from 24-27 February 2004 .

8. The theme of ICDL 2004 was “Knowledge Creation, Preservation, Access, and Management”. The conference had 55 invited speakers from 16 countries and more than 750 participants from 36 countries who shared their experiences. The conference was inaugurated by His Excellency Dr APJ Abdul Kalam, President of India. In his inaugural address the President had desired that a roadmap for manuscripts and library digitization be prepared as a follow-up activity. On conclusion of the conference a roadmap for manuscripts and library digitization was prepared and submitted to the Ministry of Culture.

CONDUCT OF THE CONFERENCE

Conference Theme

9. The theme of the ICDL 2006 was “Information Management for Global Access”. The conference was aimed at further strengthening the academic collaboration and strategic alliance in the development of DLs and e-learning in the world and focused on the creation, adoption, implementation, and utilization of DL and e-learning.

10. The conference provided an international forum for sharing of experiences among researchers, educators, practitioners, and policy makers from a variety of disciplines such as library and information science and technology, archival and museum studies, knowledge management and many areas in the fields of social sciences and humanities.

Organization

11. A number of committees viz. Advisory Committee, Steering Committee, International Programme Committee, National Programme Committee and an Organizing Committee were constituted for the purpose of guiding, preparing for and conducting the conference. The composition of these committees is given in **Appendix ‘A’**.

Preparation

12. Preparations for the conference commenced in May 2005. The National Programme Committee approved the structure to be adopted for the conference in the form of keynote addresses, tutorials and workshops, technical sessions, panel discussions, poster presentations, product presentations, and exhibitions.

Programme

13. The conference was conducted from 5-8 December 2006. The details of the conference programme are attached as **Appendix 'B'**.

Participation Fee

14. The participation fee for the conference was under:

(a) For registration done on or before 1 November 2006

<u>Delegates</u>	<u>Tutorial</u>	<u>Conference</u>	<u>Conference and Tutorial</u>
Indian	Rs 2000	Rs 6000	Rs 7500
Foreign	US\$ 80	US\$ 300	US\$ 350

(b) For registration done after 1 November 2006

<u>Delegates</u>	<u>Tutorial</u>	<u>Conference</u>	<u>Conference and Tutorial</u>
Indian	Rs 2500	Rs 6500	Rs 8000
Foreign	US\$ 100	US\$ 325	US\$ 375

Participation

15. The conference had 45 invited speakers from 17 countries and 600 registered participants which included more than 100 participants from 35 countries such as Asia, Africa, Europe, the United States of America, and Australia.

Inaugural Session

16. Welcome Address: The conference was inaugurated on 5th December 2006. Dr R K Pachauri, Director General, TERI, New Delhi, India while welcoming the participants stated that as human societies evolve, it becomes imperative to find means by which knowledge is created and disseminated and one must realize that knowledge cannot be the preserve of ivory tower institutions. It must be available and accessible to all sections of society and it is only through spreading the richness of culture and cultural resources that we can bring about social harmony. Dr R K Pachauri expressed his gratitude to the Ministry of Culture, Government of India for their patronage in the effort towards digitization of knowledge.

17. He said economists the world over tend to focus on the four key elements of economic progress – capital, labour, energy, and material – in their endeavour to unravel the finer nuances of the process of production. The missing element is usually attributed to technology. However,

the contribution of culture and social capital to the development of societies is seldom highlighted. Spread of information using modern communication and information technologies would enhance the dissemination of cultural resources.

18. Elaborating further he drew attention to the fact that there is a mix of both formal and informal institutions in society. Often the informal institutions tend to command more power than the formal structures. Powers of decision-making are many a time vested with informal institutions, as is evident in rural areas on many occasions, knowledge generated from these institutions also needs to be accumulated, stored, and disseminated for the benefit of everyone.

19. In conclusion, Dr R K Pachauri said that TERI has a deep interest in documentation and dissemination of knowledge and DLs are a vital tool in spreading information. He hoped that this august gathering would deliberate on these and other issues during the course of the conference. A full transcript of the welcome address is attached as **Appendix 'C'**

20. Keynote Address: Dr N Balakrishnan, Professor and Associate Director, Indian Institute of Science, Bangalore delivered the keynote address. He highlighted the fact that in future computers, communication and content would drive the evolution of communication technologies. Of these, the creation of content is a formidable barrier that has to be overcome and all knowledge that is created must be digitized and made available to humanity through appropriate user-friendly technologies.

21. Prof. Balakrishnan stated that when the task of creating a digital knowledge bank under the Indo-US Digital Library Project was undertaken, only two countries were regarded as being able to take up this mammoth task viz. India and China. As part of the aforesaid project, presently 21 centres have been established in the country which are equipped with high-speed scanners with a capacity to scan 500 pages of a book without tearing it. Also, at the International Conference on Universal Digital Library held in Egypt in 2005, both India and China demonstrated close to 40,000 books on the World Wide Web out of which 24,000 were in Indian languages. In 2005, the Union Minister for Human Resource Development, Mr Arjun Singh, during his visit to Saudi Arabia presented to the Government of Saudi Arabia a 300-GB compact disc with digitized versions of many Urdu and Arabic texts.

22. The vast pool of digitized data presently available has become a great source of research. Mechanized translations and automated digitization are some of the key features of this information revolution.

23. As part of the measures to preserve India's rich cultural heritage the scanning and digitization of rare manuscripts under the National Mission for Manuscripts is a step in the right direction. This digitization must also be extended to include the whole gamut of traditional material – such as Indian films, music from the All India Radio archives, and folk music.

24. The world today is gradually moving towards an internet-dependent world, and one is not wrong when one says: 'you are in this world only if you are on Google.' Therefore, the greatest challenge before us is the dissemination of knowledge, as knowledge multiplies only when circulated. Technology utilized by humanity to the fullest extent can bridge the digital divide and the younger generation must be involved in the digitization of knowledge. Prof. Balakrishnan called for the creation of a huge Indian digital repository and assured everyone that tomorrow shall be better than today. A full transcript of the keynote address of the inaugural session is attached as **Appendix 'D'**

25. Special Address: Ms Minja Yang, UNESCO Representative to Bhutan, India, the Maldives, and Sri Lanka; and Director, UNESCO, New Delhi delivered the special address. In her address she stated that UNESCO is mandated to provide universal access to knowledge. Towards this end, UNESCO's primary function is development of information structures, strengthening of libraries and archives to bridge the digital divide, providing access to knowledge and inculcating respect for culture.

26. Dissemination of knowledge through libraries is a fundamental task of UNESCO. With the development and universalization of the internet, the role of the library has infinitely changed and the knowledge gap has to be bridged sooner than later. UNESCO has been involved in the development of free and open-source software known as the Greenstone Digital Library software which supports Indian languages – such as Hindi, Bengali, Kannada, and Marathi – as well as English, Arabic, Persian, and Chinese. Also UNESCO is working with the National Informatics Centre in India to develop the 'Open Enrich System' and promote it as a resource for storage and dissemination of information.

27. UNESCO is also committed to safeguarding the global cultural knowledge system and the World Heritage Convention is a step towards facilitating the promotion of the culture industry across the world. A full transcript of the special address is attached as **Appendix 'E'**.

28. Inaugural Address: The inaugural address was given by Mr Badal K Das, Secretary, Ministry of Culture, Government of India. In his speech he said that the coming century will see the emergence of a knowledge society where knowledge will be the primary production resource and thus the sharing of knowledge will become a thrust area. Towards this end, DLs and digitization will play leading role in integrating, recording, and disseminating knowledge and empowerment of communities. He drew attention to the fact that if DLs are to enhance their utility and to give equitable access to information irrespective of local, educational and economic status, DLs would have to be highly user-friendly with speech interfaces.

29. Mr Das communicated the initiatives that have been sponsored by various Ministries of the Government of India which are aimed at promoting DLs and digitization. These include the Digital Library of India portal, the National Mission for Manuscripts and the Technology Information Facilitation Programme (TIFR). He elaborated on the challenges that were being faced in the form of lack of adequate interest on the part of institutions, the absence of action plans, an acute shortage of competent manpower and a wide digital divide. However, he hoped that in due course all these challenges will be overcome.

30. In conclusion, he said that there was a need to evolve a comprehensive plan for developing new infrastructure for extending the digital library services in regional languages in order to make the Digital Library of India, a national mission, a success. A full transcript of the inaugural address is attached as **Appendix 'F'**.

Keynote addresses

31. Three keynote addresses were delivered on the 6, 7 and 8 December 2006 respectively.

32. First keynote address: The first keynote address was delivered by **Prof. V N Rajasekharan Pillai**, Vice Chancellor, Indira Gandhi National Open University (IGNOU), New Delhi on 6 December 2006.

33. Prof. Pillai gave out the salient features of EDUSAT launched by IGNOU and how it is facilitating education and the dissemination of knowledge in backward states of the country. EDUSAT, he said, is a pioneering initiative in the digital revolution that is sweeping the educational and pedagogical arena in India. This programme focuses on education in backward states such as Madhya Pradesh, Chhattisgarh, Uttar Pradesh, and Bihar. There are presently 1500 locations across the country that are currently receiving EDUSAT signals and plans have been drawn-up for further expansion into the North-East along with special outreach programmes and elementary education projects. A teacher training programme in elementary education – a joint venture of the Ministry of Human Resource Development (MHRD), IGNOU, and Indian Space Research Organization (ISRO) – is currently under way and is working effectively.

34. IGNOU at the moment supports 26 radio stations (Gyan Vani), 124 video conferencing centres, 800 teleconferencing centres, and four television channels (Gyan Darshan). A number of emerging developments such as 'E-Gyankosh' and 'Sakshat' are also notable. 'E-Gyankosh', inaugurated in October 2005, is a national digital repository while Sakshat is a one-stop education portal being developed by the MHRD in collaboration with IGNOU. Also under way are the Pan-African tele-education and tele-medicine initiatives and broadband connectivity to all regional and study centres.

35. Prof. Pillai stated that our future lies in the digitization of knowledge and education, as 50% of the higher education system in times to come would be converted to the open distance learning mode, which is now an independent system. The library science departments in all universities must take the lead in content creation and digitization. He invited teachers to add content to the Sakshat portal. In conclusion, Prof. Pillai said that digital learning has to come into force in all universities and institutions of higher learning irrespective of whether they follow the conventional classroom system or the distance education system. A full transcription of the keynote address is attached as **Appendix 'G'**.

36. Second keynote address: The second keynote address was given by **Dr Sam Pitroda**, Chairman and CEO, WorldTel, USA and Chairperson, National Knowledge Commission, India on 7 December 2006.

37. Dr Sam Pitroda stressed on knowledge access and highlighted the pivotal role that digital libraries can play in the dissemination of knowledge. In order to do so, there is an urgent need to

modernize libraries, promote state-of-the-art information and communication technologies (ICTs) in traditional libraries to digitize the existing library resources. As compared to earlier times when people looked for information by surfing books and journals, present state-of-the-art ICTs now facilitate access of information anywhere, anytime. For this a high connectivity broadband network and a powerful user-friendly search facility too is required to access the vast knowledge that could be stored in digital format.

38. The National Knowledge Commission of India, of which Dr Pitroda is the Chairman, has acknowledged that libraries are an integral part of its programme and stresses on issues such as location, size of the library, development of a road map for the library, effective training mechanisms, research facilities, special fund opportunities from both government and private players, modern management ideas in the library, and community development and localization. There is a need in India to constitute a national body representing libraries to promote an effective library culture with a mission statement.

39. In India, he said, there is a complex issue of multi-lingual aspects. Hence, the work has to be done at all levels – national, state, district, and even village – to preserve local contents, involving local experts. With globalization and the changing market economy, innovation is a key factor that will lead to increase in productivity and growth. Dr Pitroda concluded his talk by saying: ‘knowledge is the key driver of the economy of tomorrow.’ A full transcript of the keynote address is attached as **Appendix ‘H’**.

40. Third keynote address: The third keynote address was given by **Mr Nitin Desai**, Distinguished Fellow, TERI, New Delhi and Former Under- Secretary-General for Economic and Social Affairs, Special Adviser to United Nations Secretary-General for the World Summit on the Information Society on 8 December 2006.

41. Mr Desai highlighted the need for library professionals to take an interest on how the internet is structured, managed and governed as the interface between all the areas of work is increasing and library professionals have a great capacity to contribute to these areas also.

42. The developments that have taken place in the field of digitization has offered many more possibilities for gathering, storing, organizing, retrieving and disseminating information via the internet. Also touched upon were issues related to copy right, authors rights, publishers

rights and the area of Domain Name System (DNS) and the future evolution of internet governance and management of internet infrastructure.

43. The internet uses the DNS for allocation of addresses. Similarly, libraries will need to develop a 'Classificatory Scheme' having a country and generic code for the internet site, and what generic categories would be required, who would decide on these and how these new generic categories would be brought into the structure of the DNS.

44. Also highlighted were issues on who would manage the directory. Presently, it is managed by International Corporation for Assigned Names and Numbers (ICANN), a California-based corporation bound by Californian laws and set up by the US Government. The ICANN Board decides who will handle the registry for various countries on the internet when it comes to the country sites. Many governments now want a say in these decisions pertaining to their respective countries.

45. Currently work is going on in developing the 'Digital Object Architecture', a radically new concept wherein without getting into the standards about DNS, code etc. for each object you attach a tag when you want something from the internet. Once this 'Digital Object Architecture' is developed between the management of the internet and an individual's work would become very easy.

46. Also touched upon was the need for a partnership between domain people, domain knowledge, domain scientists and other stake holders who are generating knowledge and information to create an environment and give a suitable direction for further movement. While doing so, issues of security i.e. protection against hacking into library sites must be considered.

47. In conclusion, Mr Desai said that the core issue one must really address is how one can use one's experience and knowledge to make information easier to collect, store, preserve, and then to use it as these skills would be needed more than ever as we move towards a knowledge society. A full transcript of the keynote address is attached as **Appendix 'I'**.

Tutorials and Workshops

48. A total of six tutorial sessions were held on 5 December 2006. Four parallel sessions were run in the morning and two parallel sessions were run in the afternoon. The details of the tutorial sessions are given in **Appendix ‘J’**.

49. One workshop on “Access Management” by Mr John Paschoud was held on 6 December 2006. The workshop began with a tour of the London School of Economics (LSE), with a special focus on the library. The LSE library has a collection of more than four million books, the world’s largest collection on social sciences. Discussion pertained to the definition of access management (AM), such as who can access what information, and other related problems. Four distinct processes of AM, viz, registration, revocation, authentication and accounting, and different methodologies, such as individual registration or IP authentication were deliberated upon. ‘Athens’, a proprietary solution and a gateway to access control of collective resources, and its limitations of scalability, was also discussed amongst the participants.

50. This was followed by a discussion on challenges faced by publishers and online resource vendors, and on emerging requirements of users in the context of access to resources. AM technologies such as Shibboleth and Secure Access Markup Language (SAML) were explained and elaborated upon during the workshop. The workshop concluded with brainstorming on infrastructure requirements and technical skills required for their implementation. It also made mention of the level of user education required to familiarize them with the authentication system of the library.

Technical Sessions

51. Invited Speakers: A total of 36 papers were presented by invited speakers during the conference. The details of these papers are given in **Appendix ‘K’**

52. Contributed Papers: The first call for papers was sent in February 2006 and the last date for submission of these papers was 1 June 2006. A total of 235 papers/abstracts were received. These papers were reviewed by members of the National and International Programme Committee and a total of 72 papers were short-listed for presentation during the conference. The details of these papers short-listed for presentation are given in **Appendix ‘L’**.

53. A total of 22 technical sessions were held on 6, 7, and 8 December 2006. A summary of discussion during the technical sessions is given in **Appendix ‘M’**.

Panel Discussion

54. One panel discussion was held on ‘Digital Library Policy and Security’ on 8 December 2006. The details of the Chair and Panelists are given in **Appendix ‘N’**.

55. Elsevier was introduced to the audience as a leading company working in the domain of e-journals. Elsevier highlighted the services provided by them on e-journals and the various security measures being implemented by them for safeguarding of copyright and IPR related issues.

56. The panel discussion focused on ‘Digital Library Policy and Security’ in the Indian context. The issues broadly discussed are enumerated in the following paragraphs.

57. Wider access to information: The need for wider access and advantages of open access movement were emphasized upon. As India’s share in the information market is growing, the need of the hour is a liberal access policy, facility for ‘walk-in-users’ and flexible business models.

58. Licensing agreements and copyright issues: While wider access and open access movement is recommended and desirable to help realize the full potential of DLs, proper licensing agreements and strict copyright laws were essential. Panelists discouraged systematic downloading of information.

59. Funding of public libraries: The lack of adequate funds for public libraries and its effects on modernization, digitisation, and upgrading technology was highlighted. It was felt that this could be overcome by funding of public libraries by governments and higher education bodies. Also, inadequate funds have necessitated the setting up of library consortia.

60. DL policy: The need for a proper DL policy at the national level was strongly felt. While formulating the policy on DLs at the national level due consideration must be given to ways to collaborate with internationally acclaimed agencies and isolation must be avoided. The policy must encompass issues such as selection of materials, its preservation, intellectual property right

(IPR) issues, manpower training, preservation of traditional knowledge, multilingual digitization and proper documentation of digitised material.

Poster Presentations

61. The poster presentations were held on 6-7 December 2006. The entries for the poster presentations were reviewed by members of the National and International Programme Committee and 48 presentations were finally short-listed. The details of short-listed posters presented are attached as **Appendix 'O'**.

Product Presentations

62. The product presentations were held on 6-7 December 2006. A total of ten publishers and vendors made product presentations. The details of the products presented are given in **Appendix 'P'**.

Exhibition

63. A total of 30 stalls were set up for exhibition of online products and services for the duration of the conference in the Charminar location adjacent to the conference venue in the India Habitat Centre. The details of Exhibitors and their products and services are given in **Appendix 'Q'**

Valedictory Session

64. The session started with Dr Bharati Paliwal, Librarian, TERI, extending her heartfelt thanks to the delegates and the participants for their overwhelming response. She emphasized on the importance of digital libraries and that of global access management in the modern era. She talked about the tutorials, business sessions, poster sessions, as also the currently available digital library planning and metadata access. Dr Paliwal said she looked forward to comments and suggestions from the participants.

65. Dr Leena Srivastava, Executive Director, TERI, in her special address emphasized on the need for digitization in this changing era. She also said that the recommendations of this conference could prove quite useful in the development of digital libraries in our country. The concept is very exciting and definitely one that needs to be endorsed. However, there are a few challenges related to digital libraries like the digital divide, providing internet facilities, medium of technological information, access to and cost of information, and language barriers. A

thorough emphasis has to be given to content creation, access to traditional knowledge, and knowledge management.

66. The draft recommendations of this conference were also presented in the session. Dr S M Dhawan, Library and Information Science Consultant and former Head, Library and Information Services, National Physical Laboratory, New Delhi, said that ICDL is one conference that recognizes that global access to information is essential for economic, cultural, social, scientific, and technological development. He said that several initiatives have been undertaken the world over to promote and advance global access to information. However, barriers such as copyright issues, economic issues, rapid changes in technology, bandwidth limitations and lack of trained manpower continue to hinder progress in this regard. The draft recommendations of the conference are attached as **‘Appendix ‘R’**

67. Dr Paul Nieuwenhuysen, Professor, Vrije Universiteit Brussel, Belgium, gave a presentation on his visits to India in general and his experience at the conference in particular.

68. Mr K Jayakumar, Joint Secretary, Ministry of Culture, emphasized on the recommendations presented. He said that standardization and regulations were important factors in digitization. The session ended with a vote of thanks by Mr Debal C Kar, Fellow, TERI and organizing Secretary, ICDL 2006.

DOCUMENTATION

69. Pre-Conference Proceedings : Two volumes of pre-conference proceedings and a programme guide both in printed and electronic form were given to all participants at the time of registration.

70. Conference Bulletins: For the duration of the conference, conference bulletins highlighting the days proceedings were issued on the following day prior to commencement of the conference for the information of the participants.

CONCLUSION

71. The second conference in the ICDL series has generated great enthusiasm amongst the library and information science and technology professionals around the world. It has created great awareness on the importance of digitization in the digital library community in India as well as abroad. The Conference has, on the whole, facilitated the bridging of the knowledge gaps between developing and developed countries; initiated capacity building activities in digital libraries; provided a forum for facilitating useful interaction amongst information science and technology professionals; and the most important of them all, facilitated the formulation of recommendations on digitization technologies, Acts, and policies in India. It has also helped in getting together about 600 professionals, experts, digital library workers, and information providers, from across the globe on a single platform encouraging the sharing of experiences, concerns, and ideas.

72. The conference hosted an exhibition of 30 distinguished publishers, software companies, and online service providers from India and abroad who presented the latest technological developments, online services and e-journal initiatives throughout the world.

73. The conference also boosted the enthusiasm among the government as well as library and information science and technology professionals of the importance of the digital library system. It also brought out the present status including the latest developments and techniques in this field all over the world. To understand the basics of digital preservation tools and techniques, several private and government organizations have already initiated action towards the future preservation of their documents and have approached us for inputs and assistance. Ministry of Culture has started the digitization of the cultural heritage of India.

74. The Conference discussed, among other things, several issues related to DL technologies, strengths and barriers of global access to information. The conference realizes that global access to information is essential for economic, cultural, social, scientific and technical development of the country. It also agrees and realizes that the 21st century is the era of knowledge economy; technology and knowledge are prime factors of production and service, business activities, products and services as well as management and decision-making are knowledge and technology driven. It was emphasized that digital libraries are a tool to facilitate global access to

information and a positive force to advance learning, scholarship and knowledge innovation. The barriers to global access to information are copyright and economic issues, rapid changes in technology, bandwidth limitation, lack of trained manpower and multilingual contents.

75. Keeping in mind the strengths and potentials of DLs and their role in the economic, cultural, social and technological development and also the barriers to global access to information, it is suggested that a Digital Library Act should be enacted to facilitate digitization and content creation for universal access of information. Institutions of excellence are to be set up to meet the manpower demands for establishing, developing, maintaining, and expanding DL activities. A national digital library policy should be formulated by the developing countries. Close collaboration between the digital library communities in the developing world is very important towards this end.

DETAILS OF COMMITTEES

CONFERENCE CO-CHAIRS

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Indian Institute of Science, Bangalore

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Ministry of Tourism and Culture, Government of India, New Delhi

Mr D S Mathur, IAS

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New Delhi

DETAILS OF CONFERENCE PROGRAMME

04 December 2006, Monday	
2.00-6.00 pm	Registration
Day 1	05 December 2006, Tuesday
8.00 a.m.	Registration
Conference Inauguration (The Stein Auditorium)	
09.30 – 09.40 am	<i>Welcome address</i> by Dr R K Pachauri Director-General, TERI
09.40 – 09.45 am	<i>Keynote address</i> by Dr N Balakrishnan Professor and Associate Director, Indian Institute of Science, Bangalore
09.45 – 09.50 am	<i>Special address</i> by Ms Minja Yang UNESCO Representative to Bhutan, India, Maldives, and Sri Lanka, and Director UNESCO, New Delhi
09.50 – 10.00 am	<i>Inaugural address</i> by Mr Badal K Das, IAS, Secretary, Ministry of Culture, Government of India
10.00 – 10.02 am	<i>Vote of Thanks</i> by Mr Debal C Kar Fellow, TERI, New Delhi
10.02 – 10.05 am	Inauguration of Exhibition
10.05 – 10.30 am	Tea

Appendix 'B'
(Contd...)

05 December 2006, Tuesday			
10.30 a.m.– 6.00 p.m. Tutorials			
The seven tutorials will aim to familiarize participants with the basic principles of the field, impart technical training and make them aware of the potential of DL and e-learning in the current scenario.			
10.30 a.m.– 2.00 p.m. Tutorial I			
Tutorial 1A (The Stein Auditorium)	Tutorial 1B (Jacaranda, First Floor)	Tutorial 1C (Silver Oak, Ground Floor)	Tutorial 1D (Gulmohar, First Floor)
Prof. Ian H Witten Department of Computer Science, University of Waikato, New Zealand Dr. M G Sreekumar Librarian and Head, Indian Institute of Management, Kozhikode, India UNESCO workshop on building digital library collections with Green Stone Digital Library	Prof. Paul Nieuwenhuysen Vrije Universiteit Brussel, Belgium Finding scholarly information through the Internet and the WWW: An overview of the evolution	Dr. Daniel Chandran Professor, Faculty of Information Technology, University of Technology, Sydney, Australia Aligning Knowledge Management with Business Strategy	Dr. A R D Prasad Associate Professor, Documentation Research & Training Centre, Indian Statistical Institute, Bangalore, India Building Digital Libraries using DSpace I
11.45 a.m.– 12.00 p.m. Tea			
12.00 – 2.00 p.m. Tutorial I (Continued)			
Tutorial 1A (The Stein Auditorium)	Tutorial 1B (Jacaranda, First Floor)	Tutorial 1C (Silver Oak, Ground Floor)	Tutorial 1D (Gulmohar, First Floor)
Prof. Ian H Witten and Dr. M G Sreekumar Continued	Prof. Paul Nieuwenhuysen Continued	Dr. Daniel Chandran Continued	Dr. A R D Prasad Continued
2.00 – 2.45 p.m. Lunch			
02.45 – 06.00 p.m. Tutorial 2			
Tutorial 2A (The Stein Auditorium)	Tutorial 2B (Jacaranda, First Floor)	Tutorial 2D (Gulmohar, First Floor)	
Dr. Gobinda Chowdhury Graduate School of Informatics, University of Strathclyde, UK Digital Library Usability and Evaluations	Prof. Ee-Peng Lim Associate Professor, Head, Division of Information Systems, School of Computer Engineering, Nanyang Technological University, Singapore Digital Libraries for Open Web Content (Sponsored by ICSSR, New Delhi)	Dr. A R D Prasad Associate Professor, Documentation Research & Training Centre, Indian Statistical Institute, Bangalore, India Building Digital Libraries using DSpace II	
4.15– 4.30 p.m. Tea			

04.30– 06.00 p.m.	Tutorial 2 (Continued)	
Tutorial 2A (The Stein Auditorium)	Tutorial 2B (Jacaranda, First Floor)	Tutorial 2D
Dr. Gobinda Chowdhury (Continued)	Prof. Ee-Peng Lim (Continued)	Dr. A R D Prasad (Continued)

Day 2: 06 December 2006, Wednesday		
8.00 a.m. Registration		
9.00 – 9.40 a.m. Keynote Address I (The Stein Auditorium)		
Chair: Prof Ian H. Witten Department of Computer Science, University of Waikato, New Zealand		
Speaker: Prof. V N Rajasekharan Pillai Vice Chancellor, Indira Gandhi National Open University, New Delhi		
9.45- 11.15 a.m. Technical Session 1		
Session 1A (The Stein Auditorium)	Session 1B (Jacaranda, First Floor)	Session 1C Workshop (Silver Oak, Ground Floor)
<p>Information Storage and retrieval for global access</p> <p>Chair: Prof. P B Mangla Professor Emeritus, Dept. of Lib & Inf. Sc, Delhi University, India</p> <p>Invited talk: Tengku Mohd T Sembok (Malaysia) <i>A Unified Logical Model for Information Retrieval and Question Answering Systems</i></p> <p>Contributed papers:</p> <p>1. B R Gadagin, Parashuram S. Kattimani, V.T.Kamble (India) <i>WISE: An Exciting New Development and Collaborative Model for Online Education in LIS Profession</i></p> <p>2. K Nirmala Devi, S Venkadesan, Filbert Minj, A N Manimalar (India) <i>ETD- A Scholarly Open Access Institutional Repository of IISc: A case study</i></p> <p>3. Ye Kyaw Thu and Yoshiyori Urano (Japan) <i>Query Interfaces for Retrieving Myanmar Language Digital Resources</i></p> <p>4. Parashuram S Gulbarga Kattimani, Theresa Williams and Laxmibai S. Kattimani (India) <i>Online Databases versus Web Search Engine: A study</i></p>	<p>Digital library planning, development, and management</p> <p>Chair: Prof. J L Sardana, Professor Emeritus, Dept. of Lib & Inf. Sc, Delhi University, India</p> <p>Invited talk: 1. Jakob Heide Petersen and Dr. Jens Thorhauge (Denmark) <i>Information Provision to Knowledge Creation: Danish digital libraries strategy</i></p> <p>2. K Manoj Kumar (India) <i>Information Management in Digital Libraries: Role of INFLIBNET/UGC</i></p> <p>Contributed Papers:</p> <p>1. Naicheng Chang (Taipei) and Alan Hopkinson (UK) <i>Staffing the Digital Library</i></p> <p>2. Toral Patel-Weynand, B Carroll and C Cotter (USA) <i>The National Biological Information Infrastructure: A Distributed Biological Digital Library</i></p>	<p>Workshop on access management</p> <p>Chair: Prof S B Ghosh President, Indian Association of Special Libraries and Information Centres (IASLIC) and Professor, Department of Library & Information Science, IGNOU, India</p> <p>Speaker: John Paschoud <i>Information Systems Engineer of the Library, London School of Economics, UK</i></p>
11.15 – 11.35 a.m. Tea		

Appendix 'B'
(Contd...)

11.35 a.m.– 1.05 p.m. Technical Session 2		
Session 2A (The Stein Auditorium)	Session 2B (Jacaranda, First Floor)	Workshop (Continued) (Silver Oak, Ground Floor)
<p>DL Case Studies and services</p> <p>Chair: Prof. Ee-Peng Lim Associate Professor and Head, Division of Information Systems School of Computer Engineering, Nanyang Technological University, Singapore</p> <p>Invited talk: Sunil Alag and Inder Sain (India) <i>Digital library initiative in the Department of Information Technology</i></p> <p>Contributed Papers:</p> <p>1. Simon Bains and David Dinham (UK) <i>Breaking through the walls: building a digital library at the National Library of Scotland</i></p> <p>2. Guenther Eichhorn, Alberto Accomazzi, Carolyn S. Grant, Edwin Henneken, Michael J. Kurtz, Donna M. Thompson and Stephen S. Murray (USA) <i>The Astronomy Digital Library</i></p> <p>3. T P Sankar (India) <i>Electronic resource Management at TERI</i></p> <p>4. M Suriya, R Vijay Arumugam, V Ganesh and V Kannan <i>Building an Ontology-Based Open Access Digital Archives for ICWES Proceedings (1964-2005</i></p>	<p>Digital library Network and Information Sharing</p> <p>Chair: Prof. Alejandro Bia Departamento de Estadística, Matemática e Informática, Centro de Investigación Operativa, Universidad Miguel Hernández, Spain</p> <p>Invited talk:</p> <p>1. Annelise Mark Pejtersen (Denmark) <i>A Work-centered Approach to Design and Evaluation of Digital Libraries for Collaborative Information Sharing</i></p> <p>2. Daniel Chandran (Australia) <i>Extra Territorial Applications of e-literature: A Critical Analysis of Ethical and Social Implications</i></p> <p>Contributed Papers:</p> <p>1. Mary M Somerville and Navjit Brar (USA) <i>Collaborative Co-Design: The Cal Poly Digital Teaching Library User Centric Approach</i></p> <p>2. Manoj Kumar Sinha and Saryugji Sahay (India) Status of Information Infrastructure and Computerised Library and Information Services of University Libraries in India for Information Sharing and Global Access in Network and Digital Environment</p>	<p>Workshop on access management</p> <p>Speaker: John Paschoud (UK)</p>

1.05 – 2.00 p.m.	Lunch <i>(Sponsored by Taylor & Francis Group and Blackwell Publishing)</i>
2.00 – 3.15 p.m.	Product Presentation I/Poster session I
2.00 – 2.15 p.m.	Elsevier Mr Perdeep Kumar, Sales Director (Science & Technology), Elsevier - South Asia
2.15 – 2.30 p.m.	Oxford University Press Mr. James Mercer, Regional Sales Manager
2.30 – 2.45 p.m.	American Society of Civil Engineering Mr. Will Farnam, Marketing Director
2.45 – 3.00 p.m.	Taylor & Francis Group Ms. Ashleigh Bell, Head of Journals Sales
3.00 – 3.15 p.m.	BMJ Publishing Group Mr. Nick Turner, Head of Sales
3.15 – 3.40 p.m.	Tea

Appendix 'B'
(Contd...)

3.40 – 5.30 p.m. Technical Session 3		
Session 3A (The Stein Auditorium)	Session 3B (Jacaranda, First Floor)	Session 3C (Silver Oak, Ground Floor)
<p>Digital Library and Copyright issues</p> <p>Chair: Prof S I Ahson Professor & Head, Department of Computer Science, Faculty of Natural Sciences, Jamia Millia Islamia, New Delhi, India</p> <p>Invited talk: Michael Seadle (Germany) <i>Copyright and Risk: How to Judge What to do</i></p> <p>R C Tripathi (India) <i>Copy right issues</i></p> <p>Contributed Papers:</p> <p>1. Subarna Das and Sibsankar Jan (India) Information Warfare and Piracy with Special Reference to IPR in the Open Sources of information in the Changing Context of Digital Environment</p> <p>2. Gurpreet Kaur, Shantanu Ganguly and P K Bhattacharya (India) (Invited talk) <i>Fair Use in Digital Environment</i></p> <p>3. Wende Zhang (China) <i>Digital Library and Intellectual Property Right: Evaluation and Method</i></p>	<p>E-Publishing</p> <p>Chair: Dr. Hermann Maurer Dean, Faculty of Computer Science, Chairman and Professor, Institute for Information Systems and Computer Media, Graz University of Technology, Austria</p> <p>Invited talks: Eduard Cohen (The Netherlands) <i>The importance of scholarly information in the research process</i></p> <p>Usha Mujoo Munshi (India) <i>E-Publishing: A new publishing paradigm for enhanced scholarly communication</i></p> <p>Contributed Papers:</p> <p>1. Nancy Buckley (UK) <i>Calming Content Confusion: creating standards for the movement of titles between publishers</i></p> <p>2. Rajesh Chandrakar (India) <i>Electronic Publishing Model for Indian Academic Journals</i></p> <p>3. A L Moorthy (India) (Invited talk) <i>e-Publishing</i></p>	<p>Digital libraries and Process</p> <p>Chair: Dr. Shalini R Urs Executive Director International School of Information Management, University of Mysore, India</p> <p>Invited talk: Alan Hopkinson (UK) <i>State of the art in RFID Technology</i></p> <p>H K Kaul (India) <i>Digital Libraries: Selection of Materials for Scanning</i></p> <p>Edie Rasmussen and Youngok Choi (Canada) <i>Digital Librarians for Digital Libraries</i></p>
6.00 – 7.00 p.m. Cultural Programme sponsored by Ministry of Culture		
7.00 p.m. Conference Dinner		

Day 3: 07 December 2006 (Thursday)

<p>9.00 – 9.40 am Keynote Address II (The Stein Auditorium)</p> <p style="text-align: center;">Speaker: Dr Sam Pitroda Founder and CEOC-SAM, Inc.; Chairman and CEO, Worldtel, UK; and Chairperson, National Knowledge Commission, India</p>		
<p>9.45 – 11.15 am Technical Session 4</p>		
<p>Session 4A (The Stein Auditorium)</p> <p>Online information Management</p> <p>Chair: Dr. Jagdish Arora Librarian, Indian Institute of Technology, Delhi and National Coordinator, INDEST Consortium Indian Institute of Technology, India</p> <p>Invited talk: Alejandro Bia (Spain) <i>DL content production, software engineering and future trends: the Spanish experience</i></p> <p>Contributed Papers: 1. M G Sreekumar and T Sunitha (India) <i>Community Acceptance of E-journals as a Robust Print Surrogate and Scholarship Supplement: The IIMK experience</i></p> <p>2. K Rama Patnaik (India) <i>Designing a Clearinghouse on "Criminal Justice and Human Rights Resources in India": a case study</i></p> <p>3. Mohan Raj Pradhan (Nepal) <i>Health Information Networking in Nepal: an Experience of HealthNet Nepal</i></p>	<p>Session 4B (Jacaranda, First Floor)</p> <p>Digital Library: Futuristic view</p> <p>Chair: Mr. Jean-Marc Comment Swiss Federal Archives, Switzerland</p> <p>Invited talks: 1. A R D Prasad (India) <i>Open Access to Information</i></p> <p>2. Prof. P. Tapio Varis (Finland) <i>Building global digital libraries inclusive knowledge societies</i></p> <p>Contributed Papers: 1. S Siva Chidambaram (India) <i>Documentation Framework for Establishing NIPFP- Institutional Repository using DSpace –Feasibility Study</i></p> <p>2. Subrata Deb (Invited) (Invited talk) <i>NIPER digital library: the future in digital era of pharmacology</i></p>	<p>Session 4C (Silver Oak, Ground Floor)</p> <p>Digital library models, architecture and technology</p> <p>Chair: Dr. V N Shukla Scientist 'F' & Head-Language Technology, Centre for Development of Advanced Computing (C-DAC), Noida, India</p> <p>Invited talk: John Paschoud (U K) <i>Building a National Access Federation with Shibboleth: the UK experience</i></p> <p>Contributed Papers: 1. A Balasubramanian, C V Jawahar (India) <i>Textual Search in Graphics Stream of PDF</i></p> <p>2. Vamshi Ambati, Lakshmi Pratha, C V Jawahar, N Balakrishnan, Raj Reddy (India) <i>The Digital Library of India Project Process, Policies and Architecture</i></p> <p>3. Amruth Sherikar and Rajender S Bist (India) <i>Technical Issues and Challenges in Devising Digital Libraries</i></p> <p>4. A Amrou, K. Maly and M. Zubair (USA) <i>Performance Evaluation of Freelib, a P2P based Digital Library Architecture</i></p>

<p>4. S P Jain and Sunil Gorla (India) <i>Development and management of electronic resources using open source: A case study</i></p>		
<p>11.15 am – 11.35 am Tea</p>		
<p>11.35 am – 1.05 pm Technical Session 5</p>		
<p>Session 5A (The Stein Auditorium)</p>	<p>Session 5B (Jacaranda, First Floor)</p>	<p>Session 5C (Silver Oak, Ground Floor)</p>
<p>Metadata and ontology (Dublin Core and Metadata standards with OAI –PMH)</p> <p>Chair:</p> <p>Dr. Annelise Mark Pejtersen Research Professor and Director, Center of Cognitive Systems Engineering; Aff. Professor at University of Washington, USA; Chairman of IFIP Technical Committee on Human-Computer Interaction, Denmark</p> <p>Invited talks:</p> <p>Ee-Peng Lim, Aixin Sun and Jun Zhang (Singapore) <i>Managing Metadata of Web Content for Sharing and Learning: The G-Portal Experience</i></p> <p>Shalini R. Urs (India) <i>Ontology driven knowledge management systems for digital libraries</i></p> <p>V N Shukla (India) <i>Search of content of digital libraries using the uniform metadata structure</i></p>	<p>Digital divide</p> <p>Chair:</p> <p>Prof. Alan Hopkinson Head of Library Systems, Learning Resources, The Sheppard Library, Middlesex University, U K</p> <p>Invited talk:</p> <p>David Hoole (UK) <i>Extending access to, and the impact of scientific journals in an globalised online world</i></p> <p>Contributed Papers:</p> <ol style="list-style-type: none"> Suresh Jange and Gadagin Basavaraj (India) <i>Digital Divide and ICT Initiatives for empowering the rural masses in India</i> Shampa Paul (India) <i>The Digital Divide: Evidence from Asia-Pacific Countries</i> Neena Singh and B B Gawali (India) <i>Bridging Digital Divide in India: Some challenges and opportunities</i> H S Chopra (India) <i>Digital Divide: an Indian Scenario</i> S Kumar, Anil Jain, Leena Shah, Chitresh Kala and J P Sarwan (India) <i>Role of Private Telecom Sector in Bridging Digital Divide</i> 	<p>Digital Library: Multilingual and Unicode</p> <p>Chair:</p> <p>Dr. S Mandal Director, National Library Kolkata, India</p> <p>Invited talks:</p> <p>Ratna Sanyal (India) <i>Multilingual document summarization for digital libraries</i></p> <p>V N Shukla, Karunesh Kr. Arora, Vijay Gugnani and Gour Mohan (India) <i>Digital Library and Accessibility</i></p> <p>Contributed Papers:</p> <ol style="list-style-type: none"> B A Sharada (India) <i>Digitising Multilingual Libraries: A Case Study at CIIL</i> V Chandrakumar (India) <i>Multi-scripts Information Retrieval System and Script Encoding: Some Issues</i>

<p>1.05 – 2.00 p.m. Lunch Sponsored by IEEE (Represented in India by Global Information Systems Technology Pvt Ltd)</p>		
<p>2.00 – 3.15 p.m. Product Presentation II / Poster session II</p>		
<p>2.00 – 2.15 p.m. IEEE Ms. Jean Jennings, Director of International Sales</p>		
<p>2.15 – 2.30 p.m. American Society of Mechanical Engineering Mr. Jeff Howitt, Director of Marketing</p>		
<p>2.30 – 2.45 p.m. Science Ms. Mehan Dossani, Site Licensing Sales</p>		
<p>2.45 – 3.00 p.m. Cambridge Scientific Abstracts Mr. Bart Decastro, Vice President, CSA Journals Division</p>		
<p>3.00 – 3.15 p.m. Global Information Systems Technology Pvt. Ltd Mr. Collin D'mello, Associate Vice President</p>		
<p>3.15 – 3.40 p.m. Tea</p>		
<p>3.40 – 5.30 p.m. Technical Session 6</p>		
<p>Session 6A (The Stein Auditorium)</p>	<p>Session 6B (Jacaranda, First Floor)</p>	<p>Session 6C (Silver Oak, Ground Floor)</p>
<p>Content organization and knowledge management</p> <p>Chair: Dr H K Kaul Director, DELNET Developing Library Network, New Delhi, India</p> <p>Invited talks:</p> <p>Paul Nieuwenhuysen (Belgium) <i>A Digital Library of Open Access Learning Materials about Information Management in Ocean Teacher</i></p> <p>Ingeborg Torvik Sølvsberg (Norway) Digital Libraries / Information Systems where geo-referenced information is a key component</p> <p>Contributed Papers:</p> <p>1. Mohammad Nasir Uddin (Bangladesh) and Paul Janecek* (Thailand*) <i>Designing and Implementing Faceted Classification for Flexible Search</i></p>	<p>Digital Library and e-Learning</p> <p>Chair: Dr. Edie Rasmussen Professor and Director, School of Library, Archival and Information Studies, The University of British Columbia, Canada</p> <p>Invited talk:</p> <p>Uma Kanjilal (India) <i>Developing Virtual Learning environment: A learner- centered Approach</i></p> <p>Contributed Papers:</p> <p>1. Ruth Nsibirano Kabwigu (Uganda) <i>Digital Libraries: The Right Arm of E-learning: Challenges and Opportunities in High Institution of Learning: A Case of Makerere University</i></p> <p>2 S Vaithiyathan (India) <i>Building a Learning Organisation – E-Learning, Information & Knowledge Management initiatives in L&T ECC Division – A Case Study</i></p>	<p>User studies and system evaluation</p> <p>Chair: Dr S M Dhawan Library & Information Consultant Formerly Scientist F National Physical Lab., New Delhi, India</p> <p>Invited talk:</p> <p>Gobinda Chowdhury (UK) <i>Digital Library Evaluation: How to Assess Value for Money</i></p> <p>Contributed Papers:</p> <p>1. Prakash Chand, Nishy P and Indra Sen (India) <i>Access to knowledge by Council of Scientific and Industrial Research (CSIR), India: A Case Study</i></p> <p>2. Medha Joshi and Alaka Mazumdar (India) <i>E- Journal Usage- the impact on scholarly communications – a single institution experience</i></p> <p>3. Rakesh Kumar Bhatt and Parveen Babbar (India) <i>Digital Libraries: Benchmarks for their evaluation for the effective use of digital resources</i></p>

Appendix 'B'
(Contd...)

<p>2. Pijushkanti Panigrahi (India) <i>Semantic Web: a better way of Knowledge Organization and Management on the Web</i></p> <p>3. Mahdi Shamlo, Nasser Mozayani, Homa Tavakoli (Iran) <i>A Secure platform for Content Delivery in Digital Libraries</i></p> <p>4. N Subramanian, R Balaji, M Ponraj (India) <i>Model for Establishing Knowledge Platforms: A Case Study</i></p> <p>5. Om Vikas, Akhil Kumar Meshram, Girraj Meena and Marut Chaudhary (India) <i>Architecture of Digital Library in P2P and Mobile Network</i></p>	<p>3 Pushpanjali Jena (India) <i>E-learning is a virtual media to meet the future challenges in Digital Environment: An analysis</i></p> <p>4. I V Malhan and K Shivarama Rao (India) <i>Growth in Knowledge Activities, Educational Revolution and E-Learning Initiatives: Problems and Promises for the Developing World</i></p> <p>5. Anjana Bhatnagar and Manju Anand (India) <i>E-Learning: A versatile approach in distance education</i></p> <p>6. M Shamsul Islam, M Nazim Uddin, M Hossam Haider Chowdhury and Dilruba Mahbuba (Bangladesh) <i>Impact of Digital Library on Higher Education and Research in Bangladesh</i></p>	<p>4. Zheng Songhui (China) <i>Analysis of Effects of Internet on College Students in China and Corresponding Strategies</i></p> <p>5. Anand P Singh and Kanta Kapoor (India) <i>Changes in Users' Attitude in a Hybrid Context: GGSIP University Experience</i></p> <p>6. Kim Yong Gun and Kang Jin Soo (Korea) <i>Digital Library: Reference Dialogue Service</i></p> <p>7. Anuradha Kakkar (India) <i>Evaluation of changing user needs of Social Scientists in an IT environment</i></p>
<p>6.00 – 7.00 p.m. Cultural Programme</p>		

Day 4: 08 December 2006 (Friday)		
9.00 – 9.40 am		
Keynote Address III (The Stein Auditorium)		
Chair: Mr Rod Pryde Director - British Council Division and Minister (Cultural Affairs) – British High Commission, British Council Division, New Delhi		
Speaker: Mr. Nitin Desai Distinguished Fellow, TERI, New Delhi Former Under-Secretary-General for Economic and Social Affairs, Special Adviser to United Nations Secretary-General for the World Summit on the Information Society		
9.45 – 11.15 am		
Technical Session 7		
Session 7A (The Stein Auditorium)	Session 7B (Jacaranda, First Floor)	Session 7C (Silver Oak, Ground Floor)
Open archives initiatives and Institutional repository Chair: Prof. Paul Nieuwenhuysen Vrije Universiteit Brussel, Belgium Invited talk: Krishan Lal (India) <i>Open Access: Global Perspective</i> Contributed Papers: 1. Amos Howard (Australia) <i>Digital Libraries and Institutional Repositories: Drivers for Organisational Change</i> 2. Sukhdev Singh, Naina Pandita, Surinder Kumar and Rekha Gupta (India) <i>Open Access Self-Archiving repository for the Bio-Medical Sciences: OpenMED@NIC</i> 3. V Senthil and A L Moorthy (India) <i>Online Access to DRDO Periodicals using Open Source Software</i>	Digital Library and Sustainability Chair: Prof Dr Michael Seadle Director, Institute for Library and Information Science Humboldt University, Berlin, Germany and Editor, <i>Library Hi Tech</i> Invited talk: Hermann Maurer (Austria) <i>Digital Libraries must be more than Digital Repositories</i> Contributed Papers: 1. Rajeev Vij (India) <i>Economic Issues of Digital Library: A Case Study of E-Journal Subscription in Indian Context</i> 2. Muttayya Koganuramath, Gayas Makhdumi, and V Sreenivasulu (India) <i>Building Vehicles for the Extreme Digital Libraries: Innovations and Challenges</i> 3. Tariq Ashraf and Akhtar Parvez (India) <i>Survival and sustainability: some techno-economic considerations for creating digital objects</i> 4. Stéphane Ipert (France) <i>Euroindia virtual library - A European and Indian cross cooperation project for cultural</i>	Digital library services Chair: Dr Gobinda Chowdhury Senior Lecturer Department of Computer and Information Sciences University of Strathclyde, UK Invited talk: Roshan Raina (India) <i>e-Information services in knowledge economy</i> Contributed papers: 1. Ahmed Taha (United Arab Emirates) <i>E-Research: A new Domain of digital library services</i> 2. Felix N. Ubogu (South Africa) <i>Trends in Digital Library Services in Academic Libraries in Nigeria and South Africa</i> 3. Rajesh K Bhardwaj and R K Shukla (India) <i>Re-engineering of Library and Information Services through Web Modeling at Delhi College of Engineering</i> 4. P K Jain, S C Jindal and Parveen Babbar (India) <i>Digital Libraries in India: Initiatives and Problems</i>

<p>4. R Mishra, S K Vijaijanand, P P Noufal, Rajesh Kumar and Gaurav Shukla (India) <i>Digitisation Initiatives to Destress Library Collection: A case study of ETD at P. K. Kelkar Library, IIT Kanpur</i></p>	<p><i>heritage enhancement- A concrete project with technical, legal and professional developments</i></p>	<p>5. Kiran Kaur (Malaysia) <i>Digital Libraries In Malaysia: An Overview With an E-Services Perspective</i></p>
<p>11.15 – 11.35 am Tea</p>		
<p>11.35 am – 1.05 pm Technical Session 8</p>		
<p>Session 8A (The Stein Auditorium)</p>	<p>Session 8B (Jacaranda, First Floor)</p>	<p>Session 8C (Silver Oak, Ground Floor)</p>
<p>Digital Libraries: Semantics, thesauri, ontologies</p> <p>Chair: Prof. P. Tapio Varis Acting President, Global University System, UNESCO Chair in global e-Learning with applications to multiple domains, and Professor and Chair of Media Education, University of Tampere, Finland</p> <p>Invited talks: Ian H. Witten (New Zealand) <i>Finding documents and reading them: semantic metadata extraction, topic browsing and realistic books</i></p> <p>T A V Murthy, S I Ahson, K.Srinivas (India) <i>Semantic Search Implementation for e-Journal Consortium</i></p> <p>Contributed Paper:</p> <p>1. Hiranmay Ghosh, Gaurav Harit and Santanu Chaudhury (India) <i>Ontology based interaction with multimedia collections</i></p>	<p>Digital library: Country Report</p> <p>Chair: Mr John Paschoud Information Systems Engineer of the Library, London School of Economics, UK</p> <p>Invited talks: 1. S Mandal and Syed Abuzar (India) <i>The National Library of India in the Digital Environment</i></p> <p>2. Michèle Battisti (France) <i>How 13 French Library Associations succeeded in having some exceptions in the French Law</i></p> <p>Contributed Papers:</p> <p>1. Daza (Bhutan) <i>Digitization Initiatives in the National Library of Bhutan</i></p> <p>2. Saroja Wettasinghe (Sri Lanka) <i>Digitization of the documentary heritage in Sri Lanka</i></p>	<p>Digital preservation</p> <p>Chair: Ms. Kalpana Dasgupta, Former Director, Central Secretariat Library, New Delhi and Former Librarian, National Library Kolkata, India</p> <p>Invited talks: Jean-Marc Comment (Switzerland) <i>Long-term preservation on digital documents: Some Strategic Comments</i></p> <p>Jagdish Arora (India) <i>Digital Preservation: Major Issues, Challenges and Strategies</i></p> <p>Contributed Paper:</p> <p>1. Brown Heather (Australia) <i>Who guards the guards – meeting the challenges of digital preservation</i></p> <p>2. Ramesh C Gaur (India) <i>Long Term Digital Preservation: Some initiatives in India and Germany</i></p>

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<p>2. Dennis Nicholson and Emma McCulloch (U K) Investigating the Feasibility of a Distributed, Mapping-based, Approach to Solving Subject Interoperability Problems in a Multi-scheme, Cross-service, Retrieval Environment</p>		
<p>1.05 – 2.00 p.m. Lunch <i>(Sponsored by Springer (India) Pvt Ltd)</i></p>		

2.00 – 4.00 p.m.

Panel Discussion
Digital Library Policy and Security
(The Stein Auditorium)

Many of the digital library and allied concerns are deeply rooted. This is due to lack of awareness, non-availability of standard digitization manuals for regional (localized) requirements and insufficient knowledge of policy related issues. The Governments, academic institutions, non-governmental organizations, and media as well as other information stakeholders have an enormous responsibility towards sensitizing the society and finally leading to a knowledge society by using digital technology. The challenge ahead is to develop a *Roadmap towards framing national DL policies* (IPRs, Best practices, Legislations, Access), *Social issues* including Digital Divide (Economic, Infrastructure, Language), *Economic issues* (Sources, Monitoring, Sustainability), *Technological issues* and other key issues related to digitization and digital library.

Moreover, as knowledge is put in the digital form in DL, their **intellectual security** and extent of fair use are also of major concern today. Electronic information providers and DL developers are frequently using various access management tools, technologies, IPR disclaimers, etc. to protect indigenous knowledge and originality of documents in digital form. However, it is the general feeling that in most of the developing countries, awareness needs to be created in this regard. *The panel is expected to provide their views on the ways and means of ensuring digital security and awareness development framework.*

Chair:

Mr. Jainder Singh, IAS

Secretary, Dept. of Information Technology, Ministry of Information Technology, Govt of India, New Delhi

Panelist:

Mr K Jayakumar, IAS

Joint Secretary, Ministry of Culture, Govt of India, New Delhi

Prof. P. Tapio Varis

Acting President, Global University System, UNESCO Chair in global e-Learning with applications to multiple domains, and Professor and Chair of Media Education, University of Tampere, Finland

Mr. Pavan Duggal

Advocate on IT and Cyber Law, Supreme Court of India

Mr. Frank Vranken Peeters

Managing Director, Global Sales, Elsevier Science, The Netherlands

Ms. Kalpana Dasgupta

Former Director, Central Secretariat Library, New Delhi and Former Librarian, National Library Kolkata, India

Prof. Alan Hopkinson

Head of Library Systems, Learning Resources, The Sheppard Library, Middlesex University, U.K.

Prof. Om Vikas

Director, ABV Indian Institute of Information Technology and Management, Gwalior, India

04.00 – 04.20 p.m.

Tea

04.20 – 05.20 p.m.	Valedictory Session (The Stein Auditorium)
04.20– 04.25 pm	Address by Dr Bharati Paliwal Librarian, TERI, New Delhi
04.25 – 04.35 pm	Special Address by Dr Leena Srivastava Executive Director, TERI, New Delhi
04.35 – 04.45 pm	Presentation of the Recommendation Dr S.M. Dhawan Library & Information Consultant Formerly Scientist F, National Physical Lab., India
04.45 – 04.55 pm	Keynote Address by Prof. Paul Nieuwenhuysen Vrije Universiteit Brussel, Belgium
04.55 – 05.10 pm	Valedictory Address by Mr K Jayakumar, IAS Jt Secretary, Ministry of Culture, Govt of India, New Delhi
05.10 – 05.15 pm	Presentation of Best Poster Awards by Dr Leena Srivastava, Executive Director, TERI, New Delhi
05.15 – 05.20 pm	Vote of Thanks by Mr Debal C Kar Fellow, TERI, New Delhi

WELCOME ADDRESS BY DR R K PACHAURI, DIRECTOR GENERAL, TERI

I believe this conference that we have had the privilege to organize is the second of the series and is indeed pertinent to development for the human conditions as it evolves. Everybody now believes that the 21st century will be the century of knowledge. But knowledge cannot remain knocked up behind desks, in cupboards and closets where you don't have any access to the benefits of knowledge.

2. And therefore, it is vitally important that we find means by which knowledge is not only created but it is disseminated to the right quarters because it is by far the most vital resource in ensuring human progress. We also need to think in terms of the immense need to reduce the disparities. Knowledge cannot be the preserve of ivory tower institutions and the privileged few.

3. If knowledge has to improve human conditions then it must be made available and accessible to every section of human society. And this also introduces the relevance of the knowledge to each section of society. It is not the case of one size fits all. We really need to see what kind of knowledge would be pertinent, would be beneficial and would be of direct use to different sections of society.

4. I believe therefore the patronage and the support that we've received from the Department of Culture is extremely important because it is not based merely on scientific development and innovations it also much to do with culture, tradition and history of every society. Because it is only through spreading the elements of culture, the richness and the treasure that has supported civilization like ours for centuries that we would be able to bring about social enrichment and harmony within ourselves and our society as a whole.

5. As an economist may I say that most work on economics progress and growth of economic activities has focused essentially on four sets of inputs viz. capital, labor energy, and materials. The economists essentially estimate something called the

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production function, which defines the relationship between output of goods and services and inputs of capital, labor, energy and materials.

6. And what is left over in the assessment of what is actually achieved and what might be contributed by each of these four distinct inputs is regarded as something being attributable to technological progress. And this missing element is often estimated as contribution of technology or technological change. But there is an extremely important and sometimes un-highlighted element of inputs that defines economic activity and that is culture and social capital. Because in the absence of that, you can put all the valuable inputs that can be estimated in economic term together but you are not likely to get the positive inputs in terms of goods and services produced. And I believe that spread of information using the modern means of communications and IT would make it possible to enhance this extremely vital input of culture and social capital.

7. There are of course other elements that could be defined as part of culture and social capital. And that is institutional assets. There are formal as well as informal institutions in society. We know the formal ones very well but there are large number of informal institutions and in a society like ours the informal ones are often even more powerful than the formal institutions.

8. The fact that in a village when there is any dispute, people sit down and talk whether you have an elected Panchayat or not or whether it is sub set of that Panchayat but the fact is informally you are able to use the power of decision making in a manner that optimizes the benefits of all concerns.

9. We as a research institution that has had deep interest in information dissemination, documentation, and the spread of knowledge are really delighted and privileged to be part of this initiative. And may I emphasize once again that while we are creating institutions that produce knowledge, dissemination is going to be the key in ensuring every section of society in this country benefits from this major revolution that is taking place countrywide.

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10. Digital libraries are going to be an extremely powerful instrument for dissemination of information and it would open up undoubtedly new vistas that we have not yet seen. And therefore, I believe it is extremely important that through an exchange of knowledge and ideas as we would undoubtedly have during this conference we can provide a comprehensive treatment to subject that would be extremely an important part of lives in the future and of course of the generations yet to come.

11. So may I once again welcome you all and the distinguished speakers at the head table. I am extremely grateful that Mr. Badal Das has joined us on this occasion which I think is not only symbolic of the importance that the Department of Culture attaches to this subject but also may I say the sign of friendship and support for TERI. Thank you very much.

KEYNOTE ADDRESS BY DR N BALAKRISHNAN, PROFESSOR AND
ASSOCIATE DIRECTOR, INDIAN INSTITUTE OF SCIENCE

Good morning ladies and gentlemen. Mr. Badal K Das, Secretary, Ministry of Culture, Government of India, eminent scientist Dr. Pachauri, Ms Yang, and the invisible and great organizer Debal Chandra Kar of TERI who is the main force behind organizing this conference, my fellow scientists, young inductees in the world of information sciences, special invitees, ladies and gentlemen.

2. I considered it a great honor to be here in front of you to give a special lecture at the ICDL 2006, which has become one of the most cherished and eagerly awaited conferences. First of all, I must congratulate the organizers for having arranged a great intellectual feast with tutorials, invited talks, contributed papers, product presentation and exhibitions from international and nationally reputed organizers, researchers and companies. My salutations to all of you.

3. About five years back when I visited Carnigemelon University to work with one of the visionary sons' of India, Prof. Raj Reddy, we realized that the Information and Communications Technology (ICT) in the world of information will be driven by three Cs – Computers, Communication and Contents. The first two –computers and communication, we realized would become cheaper and better and perhaps would reach the costs of an expensive dinner or a cup of coffee. But one of the greatest barriers would be the creation of contents. It is also important for our generation to ensure that every form of knowledge that is ever produced by the human race should be digitized and should be made available for free access to the entire human community without having consideration to caste, creed, color or geography or I mean the language to be a barrier. For this, content digitization is a mammoth task that can only to be compared to the building of a Great Wall of China. We surmised that only two countries could take up this job viz. India and China, because for the other countries they would find it prohibitively expensive to do this task and the project would fall by its own weight. And also, they lack the contents, which are non-digital which these two countries possess.

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4. When I got back to India I couldn't make much headway until I met Dr. A P J Abdul Kalam who was the Principal Scientific Adviser to the Government of India (GOI) at that time and now the President of India. He actually steered the project at the Indian Institute of Science (IISc) as a private project planned to demonstrate the flexibility of the technology. With that kind of support to the movement we quickly demonstrated a technology by which within about two hours it could take about 500 pages a book to the web without having to cut the book.

5. With the advent of the Ministry of Communication and Information Technology, we now have about 21 centres which have more than about 200 high speed scanners located with them, four of them being in mega centres and others with academic institutions, government and religious organizations. Amongst the government organizations, we are proud to have even the Rastrapathi Bhawan- the home of our President.

6. I am happy to tell you last month when we had the International Conference on Universal Digital Library (ICUDL) in Bibliotheca Alexandria in Egypt, between India and China we have demonstrated one million of books on the web. India produced more than 3,40,000 books with around 109 million pages scanned by 21 centres and out of which 1,24,000 of them are of Indian languages. China's performance is far more impressive and it has already done about 7,00,000 books and the Chinese government have spent about 7.8 million dollars and taken it as a national mission. Our investments are a fraction of it, but the majority of it had come from voluntary contributions.

7. The vast resource pool of digitized data has also become a fabulous resource for research in many of the institutions including the Indian Institute of Science (IISc) and Indian Institute of Information Technologies (IIITs) across the country. There are several international publications that have come out particularly the language research in Optical Character Recognition (OCR) Indian language coding, Indian language search engines, machine translations and automatic summarizations which have come to be internationally acclaimed.

8. Recently when the Minister for Human Resource Development (HRD), Government of India, Mr. Arjun Singh went to Saudi Arabia and I was fortunate enough to

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accompany him, he presented to the Saudi Arabian Library a 300 GB disc containing about 10,000 Urdu and Arabic Books scanned in India. So we have started making such specialized digitized libraries to be given to various people and today from our web site alone we get about 2,20,000 pages down loaded every day the link for which is being given by the ever-reliable ERNET.

9. Our web site is also becoming one of the most discussed ones. There are several blogs which were available which discussed about how to make better use of these things. And it is also become one of the finest resources for the Indology department across the world.

10. There have been equally impressive performances by two other digitalized library initiatives in the country. These are the manuscripts being scanned by the Ministry of Culture and also the traditional knowledge digital library spearheaded by another visionary son of the country Dr. R A Mashelkar under the Council of Scientific and Industrial Research (CSIR). But we have a long way to go.

11. The entire music repository of our All India Radio, the special events of our history from films archives, our movies, our folk songs, and so on must soon get digitized. It is time now for us to work together to make everything that has ever been produced by the Indian race and by the human race in general reach the world of digital information.

12. Today, you are in this world, only if you are on Google. There is yet another great movement in this country, the open access movement relentlessly pursued by a friend of mine by the name of Dr. Subbiah Arunachalam of M.S. Swaminathan Research Foundation (MSSRF). He has made great strides to make the scholarly communication including journals available free of cost to everyone in the world. He needs all the support.

13. I believe the greatest challenge before all of you should be to democratize knowledge and make knowledge available to everyone free at any time anywhere. Only when knowledge circulates does it get multiplied. The whole digital era is about this multiplying and circulating of knowledge. By multiplication it creates exponential growth by which the whole humanity will cross over then there will be peace everywhere.

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14. The same technology that threatens to divide the human race can rest in peace now if you can use the same technology, which is a double edged sword always. To bridge the gap, to bridge the divide by democratizing the knowledge, I am sure the great eminent people present here would ensure that this is done and the future generations would salute this and celebrate the technology rather than shying away from it.

15. I conclude my talk by recalling the poem by our President when he visited Sudan a few years back. Incidentally, I also have the great privilege of conveying his best wishes to all of you. The poem goes –

‘My mother called me Blue Nile,

I am also named by my mother, White Nile,

When we grew and grew we asked oh mother, oh mother, tell us why did you name us as Nile?

Our mother said lovingly, oh children, you travel and travel across mountains, forests, and valleys thousands of miles

Enriching nine countries till you reach Khartoum.

You Blue and White Niles confluence with the mission

God has commanded you to give this beautiful message

When these rivers confluence, oh humanity why not your hearts confluence?

And you blossom it with happiness’.

16. Taking a cue from him let us all unite like the Blue and White Niles and create a one huge Indian digital library initiative that caters to the needs of our generations in terms of our literature heritage, culture and scientific and technological knowledge.

17. I wish you all the very best. Tomorrow will be infinitely better than today we will all be more digital than ever. Thank you very much.

**SPECIAL ADDRESS BY MS MINJA YANG, UNESCO REPRESENTATIVE TO
BHUTAN, INDIA, MALDIVES AND SRI LANKA, AND DIRECTOR, UNESCO**

Mr. Badal Das Secretary for Culture, Mr. Balakrishnan, Dr. Pachauri and Mr. Debal Kar, ladies and gentlemen, and participants, good morning. It is indeed a pleasure for UNESCO to be associated with this very excited event. I have only been in this country for a year now as Director UNESCO and as the UNESCO Representative to Bhutan, India, Maldives and Sri Lanka.

2. I must say I'm increasingly impressed by the organizational capacity as well as the very rich content development of TERI. And I am very delighted to be in association with TERI for a number of activities that UNESCO is undertaking for which the work on digital libraries is one.

3. UNESCO is an inter-governmental organization mandated to promote an enabling environment conducive to universal access to information knowledge which includes standard setting, raising awareness and monitoring progress to achieve the progress to achieve this universal access.

4. Towards this end the UNESCO has been supporting the development of infrastructure of information standards and management tools, strengthening libraries and archives in fostering access information of the community level. We are therefore delighted to be associated with the international conference on digital libraries whose objectives coincide with those of UNESCO, particularly to bridge the digital divide in line with the recommendations of 2005 World Summit on Information Society.

5. UNESCO's vision of a knowledge society is based on four critical core principles viz. freedom of expression, quality education for all, universal access to information and knowledge and respect for cultural and linguistic diversity. The organization also focuses on producing, sharing and disseminating of relevant information on emerging issues that

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influence the development of our society in support of any collaboration with our member states in an effort to improve the human initiative capacity for the achievement of the Millennium Development Goals (MDGs).

6. And now with the emergence of new technologies and the internet in particular, the role of a library was compelled to undergo a change and we are ever more of conscious of this increasing gap in access of knowledge. In fact as a result of the internet it is more important that we focus on this to finding solutions to the digital divide.

7. In this context we have been active seeking partners in developing and promoting, rather than in development, of three open source softwares. One of these, is the Green Stone Digital Library Software. This I understand is produced by the New Zealand DL project at the University of Waikato and is being distributed in collaboration with UNESCO and the NGO Human Information. Recently it was launched in the South Asian Region and the Indian Institute of Management (IIM) at Kozikode. This software supports many Asian languages such as Hindi, Bengali, Kannada, and Marathi and of course Chinese, Persian, Arabic and Indonesian and has facilitated a wide ranging exchange of ideas and solutions. It is currently in the process of developing Malayalam and Telugu Urdu and Tamil language support as well.

8. UNESCO continues to seek partnership not in many exclusive ways but in every way possible to promote various initiatives and our commitment towards the Centre for Defence and International Security Studies (CDISS), which is very popular among libraries all over the world, continues.

9. Libraries in the developed world keep developing news performance systems, but for libraries in many countries in the developing world their access to CDISS has been as result of incredible investment on their part. We also feel very committed to continue to support these libraries in the developing world to shift to other performing systems.

10. We have also been working with National Informatics Center of India in propagating the open English System, which was developed in India and is now being used around the world. UNESCO is now encouraging the use and spread of the open

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English System in Africa and is also working on promoting its use as a solution for storage, retrieval and dissemination of information.

11. I would like to refer to the very enlightening introduction by the DG of TERI, in which he mentioned and emphasized on the importance of culture and social capital. Having spent 27 years in the UN system now, of which more than half is in the area of culture, I am particularly committed to the importance of safeguarding the traditional knowledge system.

12. UNESCO has various cultural activities as you know such as the World Heritage Convention, and more recently 'Convention for the Intangible Cultural Heritage', and 'Convention of the Promotion of Diversity of Cultural Expression'. These touch upon issues of language and the promotion of cultural activities in various languages of the world. This is a particularly important task in my opinion because as we see that the world is increasingly digitized and increasingly at a high-speed mode of information access. But when you look at TV programs and flip through our TV channels one after another what percent of it is really depicts creativity of our own societies? And this is where understanding among civilizations is even more important. The facility of communication has also led to an emergence of new forms of culture.

13. There is a wealth of information both in terms of historic relationships between people, between communities, between nations, that are there in the thousands of manuscripts we know authored by scholars over centuries. But these wonderful manuscripts with important knowledge contained in them are being lost everyday.

14. I have just returned yesterday from a trip to Srinagar (Jammu & Kashmir), and when I was there I was absolutely flabbergasted by the wealth of the manuscripts collection in Jammu and Kashmir. And thanks to the National Manuscripts Mission, some 6000 manuscripts were digitized this year. But this is only the tip of iceberg. When you think every corner of India contains this vast corpus of knowledge, it is vital that more effort and more recognition of the importance of digital archiving and digitalization for the maintenance of the knowledge is recognized at the highest political level. And in this

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regard, I would really like to congratulate the Government of India (GOI) for the work they are doing.

15. India is a very important member of UNESCO and we always look upon what India is doing as an example to also disseminate and to demonstrate to the other parts of the world. In conclusion, I would simply say that forums such as these are extremely important because UNESCO is mandated to produce a lot of international standards, norms and to churn out international treaties. All these mandates would be difficult to attain without the active participation of our member states, governments and civil society organizations.

16. On behalf of UNESCO I really thank all of you and look forward to receiving the outcome of your deliberations for us to be able to disseminate these to different parts of the world. Thank you.

INAUGURAL ADDRESS BY SHRI BADAL K DAS, IAS, SECRETARY,
MINISTRY OF CULTURE, GOVERNMENT OF INDIA

I am delighted to be here today to inaugurate the Second International Conference on Digital Libraries (ICDL) 2006 being organized by TERI in partnership with the Ministry of Culture, the Department of Scientific and Industrial Research and the Department of Information Technology.

2. May I convey my best wishes, at the out set, to the organizers, library and information science professionals from across the world participating in the conference, and all stake holders in the digitization and knowledge business. I am sure the next four days will provide a good opportunity for you all to share your knowledge and experiences.

3. Prosperity has always been facilitated by knowledge. The twenty first century will see the emergence of a knowledge society in which knowledge will be the primary production resource instead of labour and capital. The acquisition and sharing of knowledge has therefore become the thrust area throughout the world. Efficient utilisation of existing knowledge can create comprehensive wealth for the nation which will not only lead to employment generation, higher productivity and rural prosperity but will also vastly improve the quality of life .

4. Digitization is the trend, whether it is in the field of information science, education, literature, history, or art and culture. Libraries, museums, and other similar service institutions the world over are involved in preserving information related to culture and heritage. Digital libraries will allow such information to be integrated, recorded and disseminated to increase the potential for diversity and empowerment of communities.

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5. As the digitization process gathers momentum in India, it is imperative that we put in place national policies and procedures that will allow data to be effectively managed and controlled so that it leads to the enhancement of the national knowledge base. While doing so, we should take into account the requirements of standardization, interoperability, copyright issues, classification of documents and the selection and use of the number of library information systems available with different organizations in the country with different standards.

6. The digital libraries in India will have to be user friendly so that it will give equitable access to information irrespective of local, educational and economic status. As technologies develop further, digital libraries would have highly user friendly and speech interfaces that would enable the user to interact with information that would be language independent. All these developments would greatly enhance the utility of these digital libraries.

7. We have today many initiatives in India that are sponsored by different Ministries of the Government of India. These initiatives are promoting digital libraries and the digitization process so as to meet the knowledge challenges of the 21st century. They reach out to libraries and information centres across the country and encourage them to set up digital libraries and be a part of the Digital Library of India wherein this unique resource will be accessible to anyone in the world 24x7 .

8. The Digital Library of India Portal, inaugurated by the Hon'ble President of India in Sept 2002, is part of an ongoing mission piloted by the Ministry of Information and Technology together with the Indian Institute of Science and Carnegie Mellon University, USA as partners for fostering creativity and free access to all human knowledge. This portal will become an aggregator of all the knowledge and digital content created by other digital library initiatives in India and will also provide a gateway to Indian Digital Libraries on subjects as diverse as science, arts and culture and traditional medicine. Its Chief Coordinator for India, Prof N Balakrishnan, is with us today and he informs me that, so far 21 centres are operational throughout the country, and over 340,000 books

consisting of about 109 million pages have been digitized of which more than 124,000 are in nine Indian languages.

9. The National Mission for Manuscripts, which has a time bound activity for five years, was launched by the Ministry of Culture in Feb 2003. This was a pilot programme aimed at spreading awareness about the immensely rich cultural heritage of this country by collecting as many manuscripts as possible and digitizing these before feeding them into the national database of manuscripts. This mission today has affiliations with prominent institutions across the country which act as Manuscript Resource Centres and Manuscript Conservation Centres. These Resource and Manuscript Centres have also launched training programmes on preventive conservation, curative conservation and manuscriptology as part of their awareness spreading campaign.

10. The Technology Information Facilitation Programme (TIFR) is one of the components of the Technology Promotion Development and Utilisation (TPDU) Programme launched by the Department of Scientific and Industrial Research (DSIR) whose broad objective is to generate capacities for the development and utilization of digital information resources to provide inputs to S&T research and industrial development. One of the objectives of the Technology Information Facilitation Programme to be achieved is the creation of a digital and indigenous knowledge base which entails the capturing of full text information of dissertations/theses and R&D publications and the documentation of Traditional Knowledge and Folk Wisdom.

11. There are of course challenges that we face today in developing digital libraries in India. Some of these include the lack of adequate interest on the part of institutions, the absence of action plans, an acute shortage of competent manpower to take up the task of digitizing local content, creating information repositories and a wide digital divide.

12. The theme of this conference “**information management for global access**” is particularly relevant in the Indian context. If we in India have to realize this powerful vision, it is imperative that we bridge the poverty gap and decrease the digital divide by

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developing new infrastructure for extending digital library services in regional languages. Presently, information is only available to people from affluent communities, professionals, the corporate sector and school and college going children in urban areas. Inadequacy of information for the rural masses on account of the digital divide is a major hindrance in the path of the digital library mission. This imbalance needs to be addressed. Any developmental activity requires information and adequate information for both the individuals and planners is simply not available. Traditional library services will increasingly need to be supplemented by electronic resources making use of information technology, computers and communication.

13. The Digital Library of India is a national mission. For enabling knowledge connectivity in rural areas, we need to evolve a comprehensive plan for developing new infrastructure for extending the digital library services in regional languages. The plan should include development of the OCR (Optical Character Recognition) software in all Indian languages, language independent operating system, database servers, search engines, web servers and messaging servers. This will enable the digital library initiative to percolate to the rural masses.

14. May I therefore request the members of the Recommendation Committee to submit a draft policy document addressing the issues of standardization, copyrights, creation of infrastructure for extending the digital library services in regional languages and global access .

**FIRST KEYNOTE ADDRESS BY PROF. V N RAJASEKHARAN PILLAI, VICE
CHANCELLOR, INDIRA GANDHI NATIONAL OPEN UNIVERSITY (IGNOU),**

NEW DELHI ON 6 DECEMBER, 2006

Good morning everybody, Prof. Witten, distinguished delegates of this international conference on “Digital Libraries and other invitees. First of all I thank the organizers for extending me an invitation to come over here and interact with you and give a brief overview on Indira Gandhi National Open University’s attempts to create digital repositories through the EDUSAT.

2. I am not an expert in the field of digitization or digital libraries, I have been in the university system, basically a scientist – in the university system, and I have been interacting with the university library in a very effective way during the last 14-15 years. Also, I had the occasion to participate in one or two international conferences on digital libraries in India and abroad.

3. The organizers asked me to give an over view on the use of EDUSAT and the satellite based education which we provide through the IGNOU. You may be knowing IGNOU is looking after open and distance learning technology in education. We are spearheading various activities for providing education to those who cannot afford to get education through the conventional system of education.

4. The open and distance learning system in the country now reaches 25% of the total higher education population. In our university through our 58 regional centers across the world 36 in this country and 22 outside the country, we cater to capacity building of in-service personnel, teachers, librarians and number of other professionals.

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5. We make use of technology as far as possible for effective interaction between the academic council, which we engage, and students. We also see to it that open and distance learning technology- the concepts of science and technology of open and distance learning is made part and parcel of each and every academic program which we are offering to the students.

6. We have also interaction with almost all the governments departments. Central government departments for a capacity building of their staff and almost all the state governments for the capacity building and continuous up-gradation of capability of teachers in school education. These are the major areas which we are looking into.

7. Our motto is 'Knowledge and skill based technology led inclusive growth of the society'. When we say inclusive growth what we want to emphasize is that inclusive growth of the society can occur only when there is inclusive education, i.e. nobody should be deprived of education opportunities. Even though we are looking, focusing at higher education we have a national open school system also. We are providing for the capacity building of the National Institute of Open Learning in the country, which is looking at school education.

8. So these are our major responsibilities and coming to the specific talk which I am going to present here. It is about science, EDUSAT and digital repositories. We all know this country has an exclusive satellite for education called EDUSAT. This is a collaborative project of the Indian Space Research Organization (ISRO) and the Ministry of Human Resource Development, State Development Education with IGNOU as the nodal agency, launched in 1993 and aims at development of communication networks for education. The EDUSAT coverage can be seen in one national B beam in KU Band and one national beam extended C band six channel. And not only in India some parts of other Asian countries also EDUSAT is readily available. In 1993 we started the distant education program and now we have started building a state of the art audio visual studio at the Delhi campus with major financial and technical support from the Government of JAPAN. We have four educational channels, 26 radio stations GYAN VANI, and 134

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video conferencing centers and more than 800 tele-conferencing centers. We do video conferencing effectively for most of our training programs sitting in Delhi. We would definitely like to enhance our output in a much more effective way. Two weeks ago we have entered into an MoU with Tata Virtual Academy and the M S Swaminathan Research Foundation (MSSRF) for the training of tele-centres managers.

9. You may know that IGNOU is now the second largest broadcasting agency in the country after Door Darshan. In 1995 we started a training and development communication channel which is just becoming fully functional now.

10. Under the ISRO-IGNOU collaboration programme launched in 2002 we now have the GYAN DARSHAN channel and GYAN VANI for the audio programs. The network was converted to C band with digitalization and during the period 2002-2004 the capacity has been significantly enhanced. A total of 775 interactive receipt terminals have been distributed nationally under the Department of Education Sarva Siksha Abhiyan (DEPSSA) because we sincerely believe that providing teachers school education is a major responsibility of this country.

11. We all know that as part of Millennium Development Goals (MDG) this country made it a constitutional obligation that we will provide free and compulsory education to all children between 6-14 age group in the next 2-3 years. In order to fulfill this obligation and in addition to the millions of schools in the country we have to provide additional school education opportunities for 30 million children. Our immediate need is to have at least one million teachers in the next two years, which all our teacher education institutions put together cannot produce. So how do we provide these additional teachers? This will be possible only through technology and through open-distance learning technology combined with vast human resource potential of this country. We can achieve this and therefore IGNOU has been identified as the nodal agency to provide manpower for the teaching in the schools. We all know that the problem of availability of trained teachers in the school education system in India and all developing countries particularly African states is a real problem. For the past two to three years the Ministry of HRD,

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IGNOU and ISRO have been jointly supporting the training of teachers in elementary education in the states of Madhya Pradesh, Bihar, Chattisgarh and Uttar Pradesh and is now likely to be extended to other states.

12. But our challenge is content creation. So for effective utilization of the EDUSAT it is very necessary that the teachers, librarians, and all professionals involved should have the capability for content creation. And content creation cannot be done by technologists or engineers. Technology cannot teach but only teachers can teach. It is the responsibility and it is only teachers who can create the content. And therefore how can a conventional classroom, notebook, picture or diagram be converted into digital form. This is the real challenge and training is necessary for each and every teacher and every person and every knowledge worker in content creation

13. Content Creation is a major responsibility and there are several aspects, I will be touching upon some of the aspects briefly towards the end of the presentation.

14. The program, which we have, and the schemes we have are virtual classrooms. We are looking at virtual classrooms, video on demand, database access, online admission, online examination, radio networking – these are the activities which we are doing for teaching/learning process as well as capacity building of the teachers in the collegiate and university education system. Again, the virtual classroom configuration, the technology involved, the teaching aids the remote classroom and how teachers-student interactions are possible at various study centers.

15. We have 36 regional centers in the country, which will look after 2000 study centers. There are general study centers located in various colleges in the country and also special study centers located in specialized institutions like research institutes and other training institutions and around 50,000 academic councilors who are the teachers of IGNOU. They are not full time teachers but working in various universities under such establishments. These people are engaged in facilitating the use of all these terminals at the end by the students.

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16. We are in the developing stage and it is very important that we should provide the necessary capacity building for academic counseling as well as facilities required for each and every study center for receiving these broadcasts as well as various facilities of EDUSAT in the classroom.

17. For the data library access network configuration, which we have developed, optimum utilization of this possible only when the teachers and the students at the receiving end have the basic capability of receiving set systems. In respect of radio network configuration – our radio reaches much more than the video reach and audio-visual reach. And around 5 million students are interacting through the radio in our system.

18. Today, we have 134 locations already installed and in the next five year plan we expect a ten fold increase so as to cover the entire country. For the northeastern region which has problems because of physical inaccessibility, IGNOU has support for a special programme which involves installation of 50 additional satellite terminals.

19. Last year 'E-GYAN KOSH', a programme to create a national digital repository, was launched. And then on 30 November 2005 we have launched a one stop portal for education – SAKASHAR. It is a first step towards creating an interactive class room in which not only teachers and taught can effectively interact but anybody who is interested in the subject can interact. In addition to IGNOU, a number of other agencies, IIT Consortium, IIS, UGC, Consortium for Education Communication and NCERT are also involved in this particular project.

20. IGNOU is presently the nodal agency for executing a PAN AFRICAN education and tele-medicine initiative that has recently been launched which will connect 53 African states. The initiative is supported and looked after by President APJ Abdul Kalam directly from Rastrapati Bhawan.

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21. In addition to this we have launched two pilot programs i.e. one in management and the other in community medicine and while these programmes are underway we are exploring possibilities with the government for providing broad band connectivity to all the regional centers of the IGNOU – study centers- schools and the individual teachers in the IGNOU.

22. VIGYAN KOSH, a national digital repository project was initiated in October 2005 under Prof. Uma Kanjilal. This is again a flagship project which we have initiated and the objectives are to develop digital learning content repositories in a standard format to provide access to learning all year round, support seamless aggregation and integration of learning resources, offering uninterrupted ability and federated searching facility to create meta data, searching and browsing of learning content through multi access points, helping long time maintenance and preservation of learning materials, facilities of sharing of resources among education institutions and thereby eliminate duplication. And it is not only limited to the teaching learning programs of IGNOU, but knowledge at all levels. These repositories are multi media based and have searching and browsing facilities, access rights, management with usage tracking facility, multi lingual database, unicode complaints and seamless facilities across collection and cluster mapping is possible. These repositories are presently available in the PDF format and audio video programs are available on screening in the server. Future targets which we are intend to do achieve are live tele conferencing sessions, interactive radio chats, learning objects, animation, simulation, graphics, interactive multi media etc. class room for teachers, power point presentations all these things are planned for and we are working towards that end.

23. 'SAKSHAR', a one-stop portal for education – of the Ministry of HRD, of which SAKSHAR IGNOU is a part, was inaugurated on October 30, 2006. The objectives of SAKSHAR is it provides barrier free web based learning uniformly across the country, develop a repository of world-class interactive multi media learning content, nurture learners by providing web based guidance and encouragement through synchronous and asynchronous modes of interaction, help honing skills and knowledge through online

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mentoring. The portal is universally interactive and universally accessible in line with the expectations of the public.

24. And of course something about the changing phase of audio in India. We cater to about 20% of the total education system in India now. In the next five-year plan according to the approach paper, the government priority is that 50% of higher education system has to be through open and distance learning and it needs a lot of technology inputs. Whatever we are doing, is only very limited but in order to cater to 50% of the total education system or to enhance our 7% higher education enrolment or 7-8% higher education enrolment to at least 20% we need lot of technology inputs. And in this connection inputs on digitization and technology intervention at all levels are necessary.

25. I look forward to suggestions from experienced technologists as well as experts in digitization on many of these activities, which we do. Our IGNOU is working with a number of other universities in the world with whom we have MoUs and we look forward to technological support from other institutions and also effective interactions between other universities. Thank you very much for your patience.

**SECOND KEYNOTE ADDRESS BY DR SAM PITRODA, CHAIRMAN AND CEO,
WORLDTEL, USA AND CHAIRPERSON, NATIONAL KNOWLEDGE
COMMISSION, INDIA ON 7 DECEMBER, 2006**

It's indeed a privilege to me invited to deliver the key note speech at this important conference on digital libraries. Libraries do important functions in disseminating knowledge all over. At the National Knowledge Commission (NKC) we have been spending a fair amount of time in looking at the overall institutional infrastructure related to libraries in India.

2. As you know the NKC was established over a year ago to look into various aspects of knowledge institutions and infrastructure going forward into the 21st century. In particular, we have been focusing on access to knowledge and knowledge applications in services related to knowledge especially with a focus on e-governance. In access to knowledge, we are examining issues related to languages, translations, libraries, networks, portals, reservations, affirmative action programs and a variety of other issues which really enhance access to knowledge.

3. On concepts, our objective is to look at all aspects of education which create a foundation for knowledge concepts. This includes primary education, secondary education, distance learning, vocational education, higher education, and also new ways and means of using technology to improve productivity and efficiency in education.

4. Knowledge creation relates to science and technology copyrights, trade mark, entrepreneurship, innovations. Knowledge applications related to agriculture, small and medium scale industries, and health.

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5. In this process of trying to understand linkages with various aspects of knowledge, libraries have been an important issue for all of us. We have in India thousands of libraries. rural libraries, urban libraries, private libraries, central libraries, state level libraries and district level libraries. Many of our libraries need modernization and need to be linked. A group of experts headed by Kalpana Dasgupta have helped us to understand some of these issues.

6. We at the NKC have been able to put together a set of recommendations to be submitted to the Prime Minister and these recommendations are being finalized and will be delivered to the Prime Minister in next week or so. And in all probability we will refer to a little bit about some of these recommendations to get your input advice and create some debate to develop a consensus.

7. But before that it would be a good idea to talk a little bit about how does one acquire knowledge? Traditionally books at libraries have been the key to acquire knowledge. In the last ten years the paradigm changed completely with a new emphasis on internet. Net technology for search, mobile connectivity and laying emphasis on convergence, video voice data, electronic tools and technologies now gives a whole new way of acquiring knowledge. For example, earlier when we thought of class rooms we automatically thought of a duster, blackboard, chalk piece, work books, teacher, students, student-teacher ratio, homework, organized schedules, exam time table etc. This concept has changed substantially and today when we think of schools we don't have to think in that paradigm.

8. Today learning could be anywhere any time. It could be through TV, mobile telephone, internet, electronic media or it could be through interactions. These functions are opening up a whole new set up of possibilities in learning. Similar possibilities now exist in libraries. For you to read a book or an article you don't need to go to a library physically provided libraries have access to internet and your ability to-do Google search on a subject and that is where their service becomes critical and that is where digitization of libraries becomes very critical.

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9. Millions and millions of books are being digitized all over the world. In India because of our diversity and multiple languages, our challenges are even more complex. We have 15 major languages and we need to digitize literature books from many of these archives to be able to put it on the web. I am glad that a massive effort is going on all over the world in digitizing the libraries. We in India are also focusing on digitization of our libraries and some amount of work has already gone into it. But we have still lot more to do. We also had a major program in hand correcting our libraries for quite some time.

10. I remember in Rajiv Gandhi's era I had an opportunity to work with University Grants Commission (UGC) and others on looking at a network to interconnect libraries all over. Then it was a different kind of network and now with the web the consent of interconnecting the libraries is also very different. For example, as part of the NKC we have spent the last six months looking at knowledge that works. A network of 100 mega bites to interconnect all our universities, all our libraries, science and technology institutions, agriculture institutes and all our health facilities.

11. This kind of network requires very high capacity broadband connectivity using fibre optics. And as you know in India in the last ten-years a fair amount of fibre optic cable has been laid in the ground by our major telecom companies like Bharat Sanchar Nigam Ltd (BSNL) Mahanagar Telephone Nigam Ltd (MTNL) Tata, Reliance and many others. As a result we have some amount of excess capacity for fibres. The idea is to integrate this excess capacity as much as we can from what we already have and build up a high capacity network. If needed, a set of separate organizations could maintain and manage this network and slowly and slowly begin to connect various institutions to this big high bandwidth network to exchange information in digital format.

12. If you want to use the text you probably don't need that kind of bandwidth. But if you are going to use a small video professor from one of the Indian Institute of Technologies (IITs) he cannot only teach a group of 50-100 students but can beam all over the country. Where a large number of people can benefit from that lecture you need broadband connectivity. Similarly, a fair amount of work is required to interconnect and provide access to this network for our libraries. This is part of our program to make sure that digital information and digitized books are available anywhere and any time.

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13. Internet like Internet Services and Technologies (ISAT) had changed the paradigm not only in terms of access but also in terms of search. Today it is easier with sophisticated search engines to find information that we need. At times people spend a lot of resources in searching for information - earlier what was available in of hundreds of books is now at your fingertip with a quick search on digitized format. And that is why this is critical to digitize our books. It essentially will increase our richness in the data collected and it improves and increases the reach. So sitting anywhere from any place you can get access to this rich information base.

14. At the NKC when we looked at the libraries we felt that we need to really prepare a national census on all libraries. We don't think we have good data on the number of libraries, their locations, heads of libraries. So we really need a road map for library education, training, research facilities. We also need to reassess staffing requirements in our libraries and the need to set up a special fund perhaps for a central library – a fund where government will contribute some and private parties can contribute equally. We need to modernize our management of libraries for which we need greater community participation in local libraries and libraries in the village. We must emphasize participation from the local community to really build infrastructure and institutions and we need to promote information and communication technologies not only to connect our libraries but also to digitize our libraries.

15. We have at times rigid rules in the systems where we have very little flexibility to encourage and appreciate donations and additional funding requirements for maintenance. There is a lot of private collection in private domain that also needs to be brought into the mainstream. There are some special libraries and we really need a lot of these public private partnerships in library areas. For many of these activities we need either some kind of a mission on library or ultimately a national body, which will examine and promote library culture.

16. Many of our libraries as we all know need additional funding additional support and up-gradation. With today's technology, the movement to digitize books is probably very critical. It requires focus on local content, local language, local talent, indigenous effort and no body else is going to computerize and digitize our books. We have to do our

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books and as a result all these efforts would require not just the national effort but effort at the district, state and at village level and it will have to be a movement to rebuild our libraries. I hope that at this conference you are having the opportunity to discuss national efforts, international efforts, lessons learnt from others created standards and make sure some of these efforts are scalable, assure inter-operatability, and really create human resources required to complete the task.

17. It is not an easy task, it is an ongoing effort and it is going to probably require several years to digitize the major collection that we have. But I think the process is on and we need to drive it as we go along. The ultimate objective is to really create a new culture in the country where our children especially young children begin to use libraries to do initial research, learn more about different subjects and learn about different cultures, learn about different methods and really learn to be creative because tomorrow's economy is going to be driven by innovations.

18. For innovations, information is the input and if you don't have the right information at the right time it is difficult to understand the competitive nature of the requirements. With globalization, privatization, free market economy, competitive nature of business demands special focus on innovations. And that in turn would require access to good information. So all the efforts that are going today on digitization of libraries has to ultimately feed into not just improving knowledge but also improving our industry, our productivity, our efficiency and ultimately growth.

19. The rate at which India is planning to grow for the next 10-20 years at 9-10% would require focus on knowledge. Knowledge is going to be the key driver for the economy of tomorrow and for that digitization of libraries is an important activity. We hope that you have a great successful conference and we also hope that you get an opportunity to read our report on libraries when it comes out and it becomes public shortly. Discuss it, debate it, give us some more advice and see how collectively with your expertise and with your inputs we can implement some of these reforms we are recommending at the National Knowledge Commission on Libraries. Thank you.

**THIRD KEYNOTE ADDRESS BY DR NITIN DESAI, DISTINGUISHED FELLOW,
TERI, NEW DELHI AND FORMER UNDER- SECRETARY-GENERAL FOR
ECONOMIC AND SOCIAL AFFAIRS, SPECIAL ADVISER TO UNITED NATIONS
SECRETARY-GENERAL FOR THE WORLD SUMMIT ON THE INFORMATION
SOCIETY ON 8 DECEMBER, 2006**

I cannot think of anybody less qualified to speak here than me because I have absolutely no knowledge of Library science. And so I must tell you if you see me feeling a little nervous it has nothing to do with the subject matter but the chair that I am sitting on and I should make sure I don't fall off that chair as I speak.

2. It is a pleasure for me to be here and I am here I suspect because I chair a global group on internet governance. What I thought is I'll try to probably say something on what actually relates to the internet which has implications on how information on the net is going to be organized so that it is easy to collect, store, retrieve, use and disseminate. Let me say that in many ways I would also wish to recognize that to see the whole issue of digital libraries entirely in terms of the internet is misleading because tremendous developments have taken place in the field of digitization which are offering many more possibilities for gathering, storing, organizing, retrieving and disseminating information on the internet.

3. The internet clearly is one of the great technological advances of our time on which rest the phenomenal changes in the fields of telecommunications, computers and mass media which are unbelievable. The cost reductions that we are seeing today have changed the landscape of communications in a manner which was almost inconceivable when I was child and for that matter a young man. I remember when I was young and I remember this even in the UN and people would say half the people in the world have

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never made a phone call. I lived in a village where other than one family no body had ever made a phone call.

4. Of course it is the other half that we know about which has been touted about for the past fifteen years and I keep telling people who mention this that either it was wrong fifteen years ago or it is wrong now. Both can't be right that it was half 15 years ago and half now.

5. As we know in India it is changing dramatically. What we are looking at now is a world where over three billion people have access to a telephone, you are looking at a world where over one hand a half billion people have access to television sets and there are close to one billion personal computers. I would say these changes are phenomenal and yes or course there is a digital divide as much of this has taken place in the developed world. But changes are taking place in our part of the world also particularly when it comes to telecommunication with the capacity for text seeing via the SMS. In many ways the telecommunication set up is something, which can be thought of as being important part of the whole system of information management in society because you are not just simply talking now in terms of the telephone as an instrument for audio communication but you are looking at a telephone system in a much broader sense. Delhi today has ten million phone users and it is these huge numbers that we are looking at. So this is perhaps one of the greatest changes in the connectivity of human beings in society that we have ever seen in the history of humanity which is the capacity that I have today to sit here and connect to somebody in Antarctica.

6. The impact of internet technology has already been felt in the developed world in commerce, education, entertainment and the music industry. The television industry looks like it is going to shake-up soon. In our part of the world the classical applications are a little different viz. e-mail, news, information retrieval and of course in India two big ones - one is job search and other is bride search – these are big users in India after e-mail. That is why you are getting these new portals like naukri.com etc. As you know marriage ads and job ads are the staple in advertising in India and already with a relatively low level of

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internet penetration we have the advertising revenue of internet portals, which deal with this, getting close to what the print media gets. I think it is going to change enormously when internet penetration rate increases with the spread of broadband.

7. Let me get back to the main purpose of the talk which is what are the issues we have of internet governance and how we have been dealing with them. The issue of internet governance surfaced in the context of the world summit on information society.

8. The internet has never been a very centrally managed system but it is a very bottom up system and it is a system with brains are at the ends. Unlike the telephone system with brains in the telephone exchange, the telephone instrument is a dumb instrument. In the case of the internet the brains are in the computer at your end and there is no central computer which is capable of doing anything intelligent with what is flowing through that network. The intelligence has to be provided at the users end and not somewhere in the middle and it is very important to recognize the way in which the internet works. There are no central computers which gather the information, analyze it, besides what to and so on. Essentially if I send you a message, the message is something where my computer has to find your address and attach it to that message. It then finds its ways through this network in an arbitrary way and I call it a bit like passing a note in class. I write a note with your address and I pass it to the boy sitting next to me and boy passes it to the next one and somehow or the other the note gets to you. There is no set path by which my message will get to you. And therefore it is my computer, which has put the intelligence to that message which will allow it to reach you and not somebody else. That is the core management task in the internet and how do I ensure your uniqueness of the internet address. This is the only management task in terms of internet infrastructure.

9. There are many issues relating to the use of the net which I will just mention in a moment and this is called DNS –Domain Name System and of course allocation of addresses. I am not going into the issues of allocation of addresses and I don't think it is very central in our discussion. But a word on the DNS. In principle the domain name

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system is simply a memory device and behind each computer is a unique format number for example 203.34.50.1.

10. We needed something similar and so we had this developed essentially what you as librarians would call the 'classificatory scheme for internet site'. A classificatory scheme has a country code and a generic code. The list of countries, as defined by the UN for statistical purposes, reflected in ISO and generic standards are so simple and the responsibility for managing 'shelves' where the information for each of these sites would be, is just assigned to friends. What happens is that instead of remembering a number I could remember a name, which would be say 'buy and motor work.de.' If I type that in my query it goes a to a central computer which says the directory for 'dot de' is being held in such and such place. The query would then be addressed there and to that query the computer says okay 'buy and motor work.de' is 202.153... and that would get attached to my mail message that I am sending. This is what essentially the domain name system is about.

11. The issues of governance that have cropped up is issues like who decides and what are the generic categories that we are going to have. In one instance recently, somebody decided that we have triple X category for pornographic sites and the governments said we have some views whether there should be and if you like have a shelf in the internet, which segregates the pornographic sites.xxx. But there is no procedure for consulting with us whether you are going to introduce such category or not. So one set of issues is about how these decisions are taken on how to bring in new generic categories into this structure of DNS.

12. There are issues about who manages the directory? For instance 'dot in'. the Indian site is managed by the National Internet Exchange. The decision on who handles this is not taken by the Government of India (GOI), that decision is taken by the Internet Corporation for Assigned Names and Numbers (ICANN). It is a corporation in California, USA constituted on the laws of California and set up by the Government of the United States. And it is the ICANN Board, which decides that instead of asking X we shall ask Y

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to handle the registry for India or for dot com for this or that. And many governments have said we want a say in what to be decided when it comes to the dot in site or dot de.

13. The second set of issues, which cropped up was in the internet governance. Now the whole issue here was that nobody wants a system which makes the management of the internet heavier than it has to be. In some way some of these issues are highly routine. A lot of decisions for instance on who handles the system or some change has to be made in telephone number or whatever it is. They are fairly simple and only a handful of policy decisions which needs to be taken. Then what we are hunting for? Is it the procedure by which all the stakeholders, government, stakeholders, users, industry, service providers have a fair say before decisions are taken. I can't say it is a very open process because even though it is constituted as a not for profit- California corporation, its Board of Directors is an interest group and they will have a representative of the number source organization, they will have a representative from the country domain name system, they will have a representative from the generic domain name and it is not put together like a traditional corporate board. It is put together more as a interest group and as a procedure its functioning it is very open one, very consultative.

14. This system is evolving and there are many other issues, which are coming up for example internationalization of domain name. If I am in China and if I want a UN site I may get the page in Chinese but I will still have to type in www.un.org. And I can't put that in a Chinese character at least as for as global domain name system is concerned. So there are various restrictions now. With the use of internet spreading in developing countries this will become more of an issue.

15. We don't always appreciate this fully in India as in many ways our people are a little more used to the Latin alphabet. But you can imagine what happens in China where they have never seen that alphabet as part of their education and they will have to struggle with it. And now obviously there is great deal of pressure for what we call internationalization of domain. But then how are you going to ensure uniqueness or for that matter somebody who types in www.un.org in Latin script or in Arabic script or in

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Chinese script is directed to the same page. I can't put www.un.org in a Chinese character at least as far as the global domain name system is concerned. So there are weight restrictions now where internet is spreading into different developing countries and this is becoming more and more of an issue. We don't appreciate this fully in India, because in many ways our people are a little more used to the Latin alphabet.

16. It is as if in your library you had a Arabic numeral system for the books and the other one which is Finnish and the third one which is Devanagari and you have to make sure there is no overlap between these three systems though you have three systems of numbering in the library. Who will ensure that and for this you will have a high level body who supervises and make sure there is no overlap. And if somebody wants to go to the UN site it doesn't matter in what language you put in you get directed to the same site.

17. There are issues of this nature, which are being addressed. Now what is happening? I said partly as response to this and there are people who are working on a radically new way of handling this issue of how do I identify the place I want to get to on the net when I am out of that address in. It is called 'digital object architecture'. The man who is pushing it very hard is Robert Can. Mr. Robert Can and Windsor were good friends and are the founders of the internet. They are the ones who developed the TCPI protocol thirty years ago. But now Robert Can is moving in different directions. He is developing what he calls digital object architecture. I am not checking the events but I have heard Robert very often and I cannot say I have understood what he says. But my understanding of what he is saying is that everything that I can get on the net should have a digital tag attached with it and a number attached to it.

18. And there should be pro-sheets for giving that number which allows you in effect to know what that piece of information is. That is to say is it sound or is it a visual image or is it a text? Is it something about India or about US or Economics or History? So his point is that instead of getting into the standards about domain name system, code etc., for each object you attach a tag. When I want something on the net and I put in a query to find something about digital libraries. So what happens is that it will get translated into a

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set of numbers. Suppose I want something on digital libraries in India. Then it gets translated into set of numbers and India is 3rd part of number and it is 33. Digital libraries this much etc. and it gets directed there and I get that object coming up. If I make it very precise I will get only one answer and if it is general one I get more. That is what I understand from his 'digital object architecture'. If this is developed then the inter-phase between the management of the internet and your work becomes very close.

19. Of course that is what your work is as I see. What you really do is to see how we can organize information that we are storing in a structured categorized way so that the users like me can retrieve what we want with minimal effort. This is basically what your job is and that is to help to organize the information which is being held in a digital library or in a database or in an archive or wherever and to develop systems of classifications, categorizations, and so on.

20. And I think therefore there is a important reason why as people involved in the library movement or people involved in the digital library you should take an interest in what is happening in the field of internet governance particularly in the whole area of domain name system and its future evolution system. Because that is the real connection between your work and the whole area of internet governance. There are many interesting things that are happening on the internet and users are much more influential in shaping how the net evolves.

21. Take the whole area of search. When I go to Google and type out something I get an answer and I get a list of pages which comes up thereafter. And in many ways that list of pages which comes up certifies, and counts the number of times the user who asks for such and such piece of information to be retrieved from that page. So for instance when I typed in digital library yesterday 74 million pages web pages came up. Now the first one is the magazine which you have 'We Live' or something. And if I click on it and open it, then it gets registered by the Google saying okay- a user who asks for digital libraries clicks on this page and so something like an extra mark gets added to that page.

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22. In that sense what I get from Google is user defined. It is the sets of users who are in fact deciding the order in which you get results out of Google. It is just a whole business of users playing the role in helping other users to retrieve the information. Which is quite different from what librarians do. You like the things a little more structured and a little more organized. You gave the tag, users started giving the tag, social book marking users defined tags and so on. How is that going to connect with the sort of work which you do as organized librarians?

23. I clearly see a debating point we can call it 'focusonomy' instead of 'taxonomy'. As there is some debate going on all these and I speak as a user and I must say I was not entirely convinced that it is a users defined tag which is the best way ahead. I personally find when I get 74 million web pages when I asked for digital libraries as the starting point for my search it is not helpful. I need something a little more precise. I am very much in favor for better inter-phase between people like you who are involved in the business of making it easy for people to use this as information. To collect information, preserve it store it in many cases, disseminate it to users like me who are confronted by this vast match of this information which is now available because of the spread of internet.

24. I think we need a tremendous partnership now between domain people with domain knowledge and what we call domain scientists, or whoever else is generating that knowledge and information. It is people like you, who are involved in the world of library science and data engineers, who have to understand knowledge and on how best to preserve this type of information and data users like me. Where are we going and where is the space in which the dialogue for will take place. It is not just a conversation which you require between the communities of librarians, you need the conversation between domain scientists, data engineers, librarians and the users.

25. I think one of the challenges is to see that whether you can create this environment and I think that is the situation and direction in which we have to move and in many ways internet provides us with the technology that will allow this type of interaction not just to

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take place but to actually find practical expression in search engines, portals and many other different ways which will make the task much easier when we look into the net.

26. There is a lot else that is happening in the world. So I should stop but I want to say a few other things which are happening on the net issues like copyright, for instance? I don't see the net in many ways and changes in the arguments about copy rights, authors' rights, publishers' rights and how they should be protected in an environment where text can be easily reproduced. I don't think the net in any way creates any new set of issues except things that are easier to get hold of.

27. There is great deal of discussion in our forum on issues of governance and security, that if I have a situation where more and more of the likely services that I need are going to be provided through the net how secure is the net as related to the physical library. Then there is the phenomenon of hacking. Every year there is convention of hackers which is attended by about 10,000 people. The last one was held at Las Vegas and how many people from the library movement attend just to see what are these mischief makers are up to because it is their potential for distorting what happens in the library. They may not be interested in hacking into a library site what they are probably more interested is in hacking into commercial and governmental sites. But you cannot rule out somebody substituting a page here or a page there. How you are going to protect yourself against that? Issues of the multiplicity of languages and issues of convergence, between different media, which is now taking place already mentioned, music and internet. I think the television and internet is also converging so these are many other issues that I would have placed before you. But I believe the core issue you really need to look at is which is the greatest contribution that can be to this new world which is emerging of which people refer to as the knowledge society or cyber society? Your greatest contributions can be is to use all your experience and knowledge to make the information easier to collect, store, preserve and use. I think this is the skill which is going to be needed more and more as you move towards what people call a knowledge society.

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28. So I wish you well and I have been very happy to be able to talk to you I apologize for the fact that I have been speaking about things which perhaps are a little remote from what you have been debating in this discussion here. But I do believe that you need to take an interest in these issues on how the internet is structured managed and governed, because the inter-phase between all the areas of work is increasing and most important of all you have great capacity to contribute to that area also. Thank you very much and it is a pleasure to be here.

Appendix 'J'
(Refers to para 48)

DETAILS OF TUTORIALS

Sl. No.	Topic	Tutor
1.	UNESCO workshop on building digital library collections with Green Stone Digital Library	Prof. Ian H Witten , University of Waikato, New Zealand & Dr M G Sreekumar , Indian Institute of Management, Kozhikode, Kerala
2.	Finding scholarly information through the Internet and the WWW: An overview of the evolution	Prof. Paul Nieuwenhuysen Vrije Universiteit Brussel, Belgium
3.	Aligning Knowledge Management with Business Strategy	Dr Daniel Chandran , University of Technology, Sydney, Australia
4.	Building Digital Libraries using DSpace I	Dr A R D Prasad Indian Statistical Institute, Bangalore
5.	Digital Library Usability and Evaluations	Dr Gobinda Chowdhury , Graduate School of Informatics, University of Strathclyde, UK
6.	Digital Libraries for Open Web Content (Sponsored by ICSSR, New Delhi)	Prof. Ee-Peng Lim School of Computer Engineering, Nanyang Technological University, Singapore

DETAILS OF PAPER PRESENTATION BY INVITED SPEAKERS

Sl. No.	Subject Group	Title of the paper	Author(s)
1.	Information Storage and retrieval for global access	A Unified Logical Model for Information Retrieval and Question Answering Systems	Tengku Mohd T Sembok (Malaysia)
2.	Digital library planning, development, and management	1. Information Provision to Knowledge Creation: Danish digital libraries strategy 2. Information Management in Digital Libraries: Role of INFLIBNET/UGC	1. Jakob Heide Petersen and Dr. Jens Thorhauge (Denmark) 2. K Manoj Kumar (India)
3.	DL Case Studies and services	Digital library initiative in the Department of Information Technology	Sunil Alag and Inder Sain (India)
4.	Digital library Network and Information Sharing	1. A Work-centered Approach to Design and Evaluation of Digital Libraries for Collaborative Information Sharing 2. Extra Territorial Applications of e-literature: A Critical Analysis of Ethical and Social Implications	1. Annelise Mark Pejtersen (Denmark) 2. Daniel Chandran (Australia)
5.	Digital Library and Copyright issues	1. Copyright and Risk: How to Judge What to do 2. Copy right issues	1. Michael Seadle (Germany) 2. R C Tripathi (India)
6.	E-Publishing	1. The importance of scholarly information in the research process 2. E-Publishing: A new publishing paradigm for enhanced scholarly communication	1. Eduard Cohen (The Netherlands) 2. Usha Mujoo Munshi (India)
7.	Digital libraries and Process	1. State of the art in RFID Technology 2. Digital Libraries: Selection of Materials for Scanning 3. Digital Librarians for Digital Libraries	1. Alan Hopkinson (UK) 2. H K Kaul (India) 3. Edie Rasmussen and Youngok Choi (Canada)
8.	Online information Management	DL content production, software engineering and future trends: the Spanish experience	Alejandro Bia (Spain)
9.	Digital Library: Futuristic view	1. Open Access to Information 2. Building global digital libraries inclusive knowledge societies	1. A R D Prasad (India) 2. Prof. P. Tapio Varis (Finland)

10.	Digital library models, architecture and technology	Building a National Access Federation with Shibboleth: the UK experience	John Paschoud (U K)
11.	Metadata and ontology (Dublin Core and Metadata standards with OAI –PMH)	1. Managing Metadata of Web Content for Sharing and Learning: The G-Portal Experience 2. Ontology driven knowledge management systems for digital libraries 3. Search of content of digital libraries using the uniform metadata structure	1. Ee-Peng Lim, Aixin Sun and Jun Zhang (Singapore) 2. Shalini R. Urs (India) 3. V N Shukla (India)
12.	Digital divide	Extending access to, and the impact of scientific journals in an globalised online world	David Hoole (UK)
13.	Digital Library: Multilingual and Unicode	1. Multilingual document summarization for digital libraries 2. Digital Library and Accessibility	1. Ratna Sanyal (India) 2. V N Shukla, Karunesh Kr. Arora, Vijay Gugnani and Gour Mohan (India)
14.	Content organization and knowledge management	1. A Digital Library of Open Access Learning Materials about Information Management in Ocean Teacher 2. Digital Libraries / Information Systems where geo-referenced information is a key component	1. Paul Nieuwenhuysen (Belgium) 2. Ingeborg Torvik Sølvsberg (Norway)
15.	Digital Library and e-Learning	Developing Virtual Learning environment: A learner- centered Approach	Uma Kanjilal (India)
16.	User studies and system evaluation	Digital Library Evaluation: How to Assess Value for Money	Gobinda Chowdhury (UK)
17.	Open archives initiatives and Institutional repository	Open Access: Global Perspective	Krishan Lal (India)
18.	Digital Library and Sustainability	Digital Libraries must be more than Digital Repositories	Hermann Maurer (Austria)
19.	Digital library services	E-Information services in knowledge economy	Roshan Raina (India)
20.	Digital Libraries: Semantics, thesauri, ontologies	1. Finding documents and reading them: semantic metadata extraction, topic browsing and realistic books 2. Semantic Search Implementation for e-Journal Consortium	1. Ian H. Witten (New Zealand) 2. T A V Murthy, S I Ahson, K.Srinivas (India)

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21. Digital library: Country Report	1. The National Library of India in the Digital Environment 2. How 13 French Library Associations succeeded in having some exceptions in the French Law	1. S Mandal and Syed Abuzar (India) 2. Michèle Battisti (France)
22. Digital preservation	1. Long-term preservation on digital documents: Some Strategic Comments 2. Digital Preservation: Major Issues, Challenges and Strategies	1. Jean-Marc Comment (Switzerland) 2. Jagdish Arora (India)

DETAILS OF CONTRIBUTED PAPER PRESENTATION

Sl. No.	Subject Group	Title of the paper	Author(s)
1.	Information Storage and retrieval for global access	1. WISE: An Exciting New Development and Collaborative Model for Online Education in LIS Profession	1. B R Gadagin, Parashuram S. Kattimani, and V.T.Kamble (India)
		2. ETD- A Scholarly Open Access Institutional Repository of IISc: A case study	2. K Nirmala Devi, S Venkadesan, Filbert Minj, and A N Manimalar (India)
		3. Query Interfaces for Retrieving Myanmar Language Digital Resources	3. Ye Kyaw Thu and Yoshiyori Urano (Japan)
		4. Online Databases versus Web Search Engine: A study	4. Parashuram S Gulbarga Kattimani, Theresa Williams and Laxmibai S. Kattimani (India)
2.	Digital library planning, development, and management	1. Staffing the Digital Library	1. Naicheng Chang (Taipei) and Alan Hopkinson (UK)
		2. The National Biological Information Infrastructure: A Distributed Biological Digital Library	2. Toral Patel-Weynand, B Carroll and C Cotter (USA)
3.	DL Case Studies and services	1. Breaking through the walls: building a digital library at the National Library of Scotland	1. Simon Bains and David Dinham (UK)
		2. The Astronomy Digital Library	2. Guenther Eichhorn, Alberto Accomazzi, Carolyn S. Grant, Edwin Henneken, Michael J. Kurtz, Donna M. Thompson and Stephen S. Murray (USA)
		3. Electronic resource Management at TERI	3. T P Sankar (India)
		4. Building an Ontology-Based Open Access Digital Archives for ICWES Proceedings (1964-2005)	4. M Suriya, R Vijay Arumugam, V Ganesh and V Kannan
4.	Digital library Network and Information Sharing	1. Collaborative Co-Design: The Cal Poly Digital Teaching Library User Centric Approach	1. Mary M Somerville and Navjit Brar (USA)
		2. Status of Information Infrastructure and Computerised Library and Information Services of University Libraries in India for Information Sharing and Global Access in Network and Digital Environment	2. Manoj Kumar Sinha and Saryugji Sahay (India)

5.	Digital Library and Copyright issues	1. Information Warfare and Piracy with Special Reference to IPR in the Open Sources of information in the Changing Context of Digital Environment 2. Fair Use in Digital Environment 3. Digital Library and Intellectual Property Right: Evaluation and Method	1. Subarna Das and Sibsankar Jana (India) 2. Gurpreet Kaur, Shantanu Ganguly and P K Bhattacharya (India) 3. Wende Zhang (China)
6.	E-Publishing	1. Calming Content Confusion: creating standards for the movement of titles between publishers 2. Electronic Publishing Model for Indian Academic Journals 3. E-Publishing	1. Nancy Buckley (UK) 2. Rajesh Chandrakar (India) 3. A L Moorthy (India)
7.	Online information Management	1. Community Acceptance of E-journals as a Robust Print Surrogate and Scholarship Supplement: The IIMK experience 2. Designing a Clearinghouse on "Criminal Justice and Human Rights Resources in India": a case study 3. Health Information Networking in Nepal: an Experience of HealthNet Nepal 4. Development and management of electronic resources using open source: A case study	1. M G Sreekumar and T Sunitha (India) 2. K Rama Patnaik (India) 3. Mohan Raj Pradhan (Nepal) 4. S P Jain and Sunil Gorla (India)
8.	Digital library: Futuristic view	1. Documentation Framework for Establishing NIPFP-Institutional Repository using DSpace – Feasibility Study 2. NIPER digital library: the future in digital era of pharmacology	1. S Siva Chidambaram (India) 2. Subrata Deb (Finland)
9.	Digital library models, architecture and technology	1. Textual Search in Graphics Stream of PDF 2. The Digital Library of India Project Process, Policies and Architecture 3. Technical Issues and Challenges in Devising Digital Libraries 4. Performance Evaluation of Freelib, a P2P based Digital Library Architecture	1. A Balasubramanian and C V Jawahar (India) 2. Vamshi Ambati, Lakshmi Pratha, C V Jawahar, N Balakrishnan and Raj Reddy (India) 3. Amruth Sherikar and Rajender S Bist (India) 4. A Amrou, K. Maly and M. Zubair (USA)

10. Digital divide	<ol style="list-style-type: none"> 1. Digital Divide and ICT Initiatives for empowering the rural masses in India 2. The Digital Divide: Evidence from Asia-Pacific Countries 3. Bridging Digital Divide in India: Some challenges and opportunities 4. Digital Divide: an Indian Scenario 5. Role of Private Telecom Sector in Bridging Digital Divide 	<ol style="list-style-type: none"> 1. Suresh Jange and Gadagin Basavaraj (India) 2. Shampa Paul (India) 3. Neena Singh and B B Gawali (India) 4. H S Chopra (India) 5. S Kumar, Anil Jain, Leena Shah, Chitresh Kala and J P Sarwan (India)
11. Digital Library: Multilingual and Unicode	<ol style="list-style-type: none"> 1. Digitising Multilingual Libraries: A Case Study at CIIL 2. Multi-scripts Information Retrieval System and Script Encoding: Some Issues 	<ol style="list-style-type: none"> 1. B A Sharada (India) 2. V Chandrakumar (India)
12. Content organization and knowledge management	<ol style="list-style-type: none"> 1. Designing and Implementing Faceted Classification for Flexible Search 2. Semantic Web: a better way of Knowledge Organization and Management on the Web 3. A Secure platform for Content Delivery in Digital Libraries 4. Model for Establishing Knowledge Platforms: A Case Study 5. Architecture of Digital Library in P2P and Mobile Network 	<ol style="list-style-type: none"> 1. Mohammad Nasir Uddin (Bangadesh) and Paul Janecek (Thailand) 2. Pijushkanti Panigrahi (India) 3. Mahdi Shamlo, Nasser Mozayani, Homa Tavakoli (Iran) 4. N Subramanian, R Balaji, M Ponraj (India) 5. Om Vikas, Akhil Kumar Meshram, Girraj Meena and Marut Chaudhary (India)
13. Digital Library and e-Learning	<ol style="list-style-type: none"> 1. Digital Libraries: The Right Arm of E-learning: Challenges and Opportunities in High Institution of Learning: A Case of Makerere University 2. Building a Learning Organisation – E-Learning, Information & Knowledge Management initiatives in L&T ECC Division – A Case Study 3. E-learning is a virtual media to meet the future challenges in Digital Environment: An analysis 4. Growth in Knowledge Activities, Educational Revolution and E-Learning Initiatives: Problems and Promises for the Developing World 	<ol style="list-style-type: none"> 1. Ruth Nsibirano Kabwigu (Uganda) 2. S Vaithiyathan (India) 3. Pushpanjali Jena (India) 4. I V Malhan and K Shivarama Rao (India)

	5. E-Learning: A versatile approach in distance education	
	6. Impact of Digital Library on Higher Education and Research in Bangladesh	5. Anjana Bhatnagar and Manju Anand (India) 6. M Shamsul Islam, M Nazim Uddin, M Hossam Haider Chowdhury and Dilruba Mahbuba (Bangladesh)
14. User studies and system evaluation	1. Access to knowledge by Council of Scientific and Industrial Research (CSIR), India: A Case Study 2. E- Journal Usage- the impact on scholarly communications – a single institution experience 3. Digital Libraries: Benchmarks for their evaluation for the effective use of digital resources 4. Analysis of Effects of Internet on College Students in China and Corresponding Strategies 5. Changes in Users' Attitude in a Hybrid Context: GGSIP University Experience 6. Digital Library: Reference Dialogue Service 7. Evaluation of changing user needs of Social Scientists in an IT environment	1. Prakash Chand, Nishy P and Indra Sen (India) 2. Medha Joshi and Alaka Mazumdar (India) 3. Rakesh Kumar Bhatt and Parveen Babbar (India) 4. Zheng Songhui (China) 5. Anand P Singh and Kanta Kapoor (India) 6. Kim Yong Gun and Kang Jin Soo (Korea) 7. Anuradha Kakkar (India)
15. Open archives initiatives and Institutional repository	1. Digital Libraries and Institutional Repositories: Drivers for Organisational Change 2. Open Access Self-Archiving repository for the Bio-Medical Sciences: OpenMED@NIC 3. Online Access to DRDO Periodicals using Open Source Software 4. Digitisation Initiatives to Destress Library Collection: A case study of ETD at P. K. Kelkar Library, IIT Kanpur	1. Amos Howard (Australia) 2. Sukhdev Singh, Naina Pandita, Surinder Kumar and Rekha Gupta (India) 3. V Senthil and A L Moorthy (India) 4. R Mishra, S K Vijaiand, P P Noufal, Rajesh Kumar and Gaurav Shukla (India)
16. Digital Library and Sustainability	1. Economic Issues of Digital Library: A Case Study of E-Journal Subscription in Indian Context 2. Building Vehicles for the Extreme Digital Libraries: Innovations and Challenges	1. Rajeev Vij (India) 2. Muttayya Koganuramath, Gayas Makhdumi, and V Sreenivasulu (India)

	3. Survival and sustainability: some techno-economic considerations for creating digital objects	3. Tariq Ashraf and Akhtar Parvez (India)
	4. Euroindia virtual library - A European and Indian cross cooperation project for cultural heritage enhancement- A concrete project with technical, legal and professional developments	4. Stéphane Ipert (France)
17. Digital library services	1. E-Research: A new Domain of digital library services	1. Ahmed Taha (United Arab Emirates)
	2. Trends in Digital Library Services in Academic Libraries in Nigeria and South Africa	2. Felix N. Ubogu (South Africa)
	3. Re-engineering of Library and Information Services through Web Modeling at Delhi College of Engineering	3. Rajesh K Bhardwaj and R K Shukla (India)
	4. Digital Libraries in India: Initiatives and Problems	4. P K Jain, S C Jindal and Parveen Babbar (India)
	5. Digital Libraries In Malaysia: An Overview With an E-Services Perspective	5. Kiran Kaur (Malaysia)
18. Digital Libraries: Semantics, thesauri, ontologies	1. Ontology based interaction with multimedia collections	1. Hiranmay Ghosh, Gaurav Harit and Santanu Chaudhury (India)
	2. Investigating the Feasibility of a Distributed, Mapping-based, Approach to Solving Subject Interoperability Problems in a Multi-scheme, Cross-service, Retrieval Environment	2. Dennis Nicholson and Emma McCulloch (U K)
19. Digital library: Country Report	1. Digitization Initiatives in the National Library of Bhutan	1. Daza (Bhutan)
	2. Digitization of the documentary heritage in Sri Lanka	2. Saroja Wettasinghe (Sri Lanka)
20. Digital preservation	1. Who guards the guards – meeting the challenges of digital preservation	1. Brown Heather (Australia)
	2. Long Term Digital Preservation: Some initiatives in India and Germany	2. Ramesh C Gaur (India)

SUMMARY OF DISCUSSIONS HELD ON SUBJECT GROUPS DURING
THE TECHNICAL SESSION

Information Storage and Retrieval for Global Access

1. The Chairperson initiated the session by putting forward his views on information storage and retrieval for global access. He focused on the various search methods used for retrieving information.
2. The discussion began with an emphasis on search strategy by using search engines like Google and Yahoo, the types of searches conducted by these engines, and the indexing process that they follow. It was stressed that the logical-linguistic model was one of the attempts made to incorporate higher level of processing and knowledge-based representation. Differences between semantic, syntactical, and logical search processes and the revenues earned by these search engines were also elaborated upon. The talk ended by comparing the various search engines in use.
3. This was followed by a presentation on Web-based Information Science Education (WISE), a consortium of 12 universities that have come together to share classes, students, and resources for a while, the pros and cons of providing online education and the future of online education in the field of library and information sciences. A number of questions were raised leading to a lively discussion.
4. A detailed presentation on a study of the institutional repository of the J R D Tata Memorial Library was one of the highlights of the session. The presentation focused on the collection of electronic versions of theses and dissertations, and how they are stored in the digital format. It was stated that more than 6000 theses are available in digital format. The various steps involved in digitization of the document such as the theses were also described. Accessibility of thesis resources was also a major issue that was taken up in the session. The presentation included screenshots of stored theses and dissertations in the digitized format.

5. The session concluded with a hugely participative discussion following an enlightening talk on query interfaces for retrieving digital resources in Myanmar language. The two primary query interfaces used for retrieving Myanmar language resources were ‘wild card’ and ‘automatic author name prediction’.

Digital Library Planning, Development and Management

6. The session described in detail the Government of Denmark’s initiatives in improving libraries in the country. It was highlighted that with the introduction of the internet, the role of the librarians has changed from a collectionist to a person with multiple connections with the world wide web (WWW) and therefore an internal reorganization of the existing tasks of librarians was stressed upon. It was recommended that emphasis should be laid on the new tasks of a librarian like e-learning, knowledge management, analysis of information supply, e-publishing, copyright, and intellectual property rights and tasks such as accession and acquiring documents could be outsourced.

7. The discussion focused on the role of Information and Library Network (INFLIBNET) in India and presently INFLIBNET focuses on packaged digital information software and advice to 149 universities and 3000 colleges across the country. Also discussed was the meaning, definition, and core elements of any functioning digital library and introduced the Software for University Libraries (SOUL) library software. The Eleventh Five-year Plan recommendations on document models was emphasized upon.

8. The session highlighted the role of Extensible Markup Language (XML) software in library and information services. It was recommended that XML software education should be included in the school-level library science curriculum. Librarians’ roles in computing in the UK, the US, and Taiwan were also discussed.

9. A glimpse of the mission and vision of the National Biological Information Infrastructure (NBII) in the US was also presented. The NBII presentation elaborated upon the strategic plans, national objectives, and functionality of the NBII—a growing distributed digital library of

biological information. The smooth workflow in a digitized environment and the user-centric approach adopted by the NBII was highlighted.

Digital Library Case Studies and Services

10. The session focused on user needs, accessibility, and usability. The purpose of building a digital library will be defeated if it fails to offer customers what they want, if they are unable to gain easy access, or if they find using digital libraries too complicated, both in terms of content and navigability. The National Aeronautics and Space Administration (NASA) digital library service allows searching of three databases with abstracts relating to astronomy/planetary sciences, physics/geophysics, and the archive e-prints, through almost five million records. There is a separate site dedicated to India among the 11 minor sites. The Knowledge Management Repository of The Energy and Resources Institute (TERI) was discussed at length, including the e-library. The paper presented at this session generated a lot of discussion. Another significant issue discussed was the layout and form of a library building keeping in mind the requirements of a digital library.

11. Recommendations made during the discussion referred to promoting preservation and usability of information, encouraging market research to promote the use of digital resources, sharing information between libraries, and sending information alerts to users.

Digital Library Network and Information Sharing

12. The session focused on Digital Library Annotation Services (DiLAs), its goals, the support of 'create annotation task', expert evaluation system to re-design DiLAs, and other related issues. The annotation system coordinates with the metadata through the group participation evaluation methods. There are three types of evaluation systems and the project model describes these in brief. The meaning, benefits and current publishing trends of e-books were also discussed. There was emphasis on 'Google book search' and the way it is digitizing material. Under Project Gutenberg, which produces e-books, the monetary benefits are given to the publisher rather than the author. There was a recommendation that this task be handled by government organizations rather than a corporate entity.

13. Ethical, professional, and social issues related to e-literature were brainstormed in the session. Google does not make available sensitive political information. The session also focused on the Cal Poly Digital Teaching Library, its initiatives, and its influence on the search environment. The emphasis was on collaborative co-design on the searching system of libraries. The five laws propagated by S R Ranganathan were also revisited. The session went on to discuss the status of information infrastructure and computerized library and information services of university libraries in India for information sharing and global access in networks and digital environment.

Digital Library and Copyright Issues

14. The session focused on digital library and copyright issues such as the various factors that are involved in copyright infringement, the risks associated with violation of copyright laws and fair use of copyright laws or acts in a digital environment. Participants also discussed intellectual property rights in a digital environment. The other factors stressed upon were digital rights management, judicial acts meant to deal with infringement of copyright laws, and remedies available against infringement.

15. The session included a brief presentation on copyright protection, copyright issues, various penalties imposed on copying of documents, sound clips, and so on. Finer nuances of the creative commons license, which makes material free to copy, distribute, and display was also discussed. The issue of out-of-print or orphaned work was also raised and discussed.

16. A system of common license for both authors and publishers to provide free and fair information to everybody was advocated for. Also recommended in the session was 'copyright policing' as a social policy for the security of information.

17. This was followed by a presentation on Indian Copyright Laws, the Copyright Act, and Intellectual Property Rights. Internet services and protocols and copyright issues, plagiarism, and tenure of copyright licenses were also discussed.

18. The concept of fair use in a digital environment, infringement of copyright and digital rights management was the focus of another enlightening presentation, which primarily dealt with the paradigm shift towards the electronic media. Issues like remedies against infringement were emphasized upon.

19. The session concluded with a presentation on digital libraries, intellectual property rights, and evaluation of intellectual property rights in digital libraries.

E-Publishing

20. The session deliberated upon some of the important e-publishing paradigms and touched upon and attempted to present an e-publishing road map covering the usage pattern. A case study of Indian National Science Academy (INSA) initiatives for institutional archives was also presented.

21. The discussion highlighted the pros and cons of movement of titles between publishers and the resultant implications for the creator, researcher, librarian, publisher, and the intermediaries. 'Project Transfer' launched by the United Kingdom Serials Group (UKSG) was also discussed in the session.

22. Establishment of a national level gateway/portal of Indian scholarly journals, supporting multilingual format, was strongly advocated for by participants. Recommendations made during the course of the discussion were in favour of archiving for free and open access, more budgetary allocations to libraries for better R&D, and harmonization in pricing of e-publications.

Digital Libraries and Process

23. The session opened with a talk on the current trends in the art in Radio Frequency Identification (RFID) technology use in libraries, which included a case study of the University of Middlesex, UK. The need for international standards and the advantages of the RFID technology over traditional methods was emphasized.

**Appendix ‘M’
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24. This was followed by a presentation on selection of material for scanning in digital libraries. Issues like the value of the document being digitized, demand for the said document, and the availability of the document in the digital form were stressed upon.

25. The need for avoiding duplication was also discussed and suggestions were made on a collaborative programme. Certain important principles for selection of documents like copyright preservation facilities, adequate financial resources, and guidelines to be followed while digitizing the document were laid down for future reference and use, followed by the recommendation of a National Digital Archive.

26. The session concluded with an inspiring presentation, titled ‘Digital Librarians for Digital Libraries’. It emphasized the need for proper education and training for developing competencies among librarians to meet the challenge of the growing digital environment. The session stressed on the fact that there was a shortage of trained professionals in the prevailing work force. Some guidelines of the proposed training programme were also suggested.

27. Initiatives taken in European countries and subsequent digital library curricula developed at several universities were discussed with the help of an exhaustive survey, the results of which were presented. The survey revealed that more than qualifications in the field of library science, employers look for managerial and communication skills in prospective employees.

Online Information Management

28. Digital libraries must constantly experiment and innovate to enhance services. The various advantages of digital libraries are worldwide access and non-linear surfing through the digital material. Software engineering has contributed greatly to the digitizing process by developing specialized tools, prototypes, etc. Broad views of the incremental development process models and evolutionary development process models were also given. The role of journals in scholarly communication was discussed.

29. E-journal technologies and services are still under evolution. A variety of subscription models, access methods, wavering pricing policies, and complex licensing and copyright policies

continue to be major challenges. Several outreach and marketing strategies have been adopted. Some of these include web based library marketing, library portals, content integration, aggregation usage monitoring, and usability studies. Information literacy and the constitutions of usage committee have enhanced their services.

30. HealthNet, a Nepal-based portal that provides information to the Nepalese health community, was also discussed. This provides affordable internet services, access to health information and technical support for several national and regional information-sharing initiatives. Yet another case presented was that of the Govindballabh Pant Agricultural University and its development and management of e-resources. In-house databases were developed, and linked with full-text for publishing on internet, using Windows Integrated Set of Information System (WIN ISIS) / General Integrated Set of Information System (GEN ISIS).

Digital Library: Futuristic View

31. The session opened with a talk on open access to information and open-access initiatives. The discussion dwelt on barriers to open communication like language and existing copyright restrictions that are heavily biased in favour of publishers. Suggestions on alternatives to peer-review system like open peer review and commentary- or citation-based reviews were made in the course of the presentation. The presentation also focused upon open access initiatives in India using software like Greenstone Digital Library (GSDL), Dspace, Fedora, and so on.

32. A presentation was made on ‘Building Global Inclusive Knowledge Societies’ emphasizing the value-crisis identity problem and alternative technology in establishing an inclusive knowledge society. The session also touched upon the need for university systems to promote open educational resources citing the example of United Nations Educational, Scientific and Cultural Organization (UNESCO). The need for media literacy and e-learning, promotion of global literacy, social competence, and responsibility as well as the role of web logs were some of the other issues discussed.

33. Issues on documentation activities at National Institute of Public Finance and Policy (NIPFP) in a digital environment were discussed with a focus on the economics of information

delivery. It was argued that an institutional repository is the need of the hour. The role of Dspace in leveraging such a repository was also discussed.

34. The session concluded with a presentation on the ‘Implications of Digital Library Services in Pharmacology’ describing the existing online services and electronic resources at National Institute of Pharmaceutical Education and Research (NIPER).

Digital Library Models, Architecture, and Technology

35. The session began with a talk on ‘Building a National Access Federation with Shibboleth: the UK experience’. The presentation focused on Shibboleth in the context of UK; history of the ‘Athens Access Management System’ working with universities, schools, publishers; and using Shibboleth as a global access management system. It also included information on the Joint Information Systems Committee (JISC) information environment and a functional diagram of the ‘Athens Access Management System’.

36. Other aspects of the JISC system such as core middleware and infrastructure programmes, technology development, early adopters, transition plans, and so on were an integral part of the presentation. The presentation further highlighted the advantages of the Shibboleth–Athens Gateway, and charted out a road map for institutions for installing Shibboleth software based on existing installation and communication feedback.

37. The session laid emphasis on textual search in the graphic stream of Portable Document Format (PDF) and covered introduction, digital document categories, application domains, and research issues. The scope of work, searches in digital libraries, retrieval, approaches for recognition, dynamic time, warping, and Indian language issues using PDF were also discussed.

38. The discussion focused on the ‘Digital Library of India Project’. The present scenario in the digital library project with emphasis on the approach of the project, problems and challenges like procurement of books, incomplete and incorrect metadata, duplication, data management, and so on were discussed in detail as also were several policy issues. The discussion then moved to technical issues and challenges in devising digital libraries. The digitization of Gandhi Smriti

Library at Lal Bahadur Shastri National Academy of Administration (LBSNAA) was cited as an example.

39. The session concluded with a talk on performance evaluation of Freelib—a Peer to Peer (P2P)-based digital library architecture. Key concepts such as user feedback, content and access patterns analysis, peer ranking, performance evaluation, client design, and implementation were identified.

Metadata and Ontology (Dublin Core and Metadata Standards with Open Archives Initiatives-Protocol Metadata Harvesting (OAI-PMH)

40. In the education domain, teachers and students are beginning to depend more heavily on the web to acquire knowledge that is not found in books and is more up-to-date. The usage of Wikipedia has increased to a great extent among the academic community. New web-based e-learning standards and specifications such as Sharable Content Object Reference Model and Institute of Electrical and Electronics Engineers (IEEE) learning object have been defined to facilitate inter-operability and reusability of learning objects, which can be digital or non-digital entities used for learning and education.

41. A presentation on G-Portal interface and its functionality was also made in the session. The various attributes of semantic web and ontology application in the Vidyanidhi project were discussed. A detailed explanation was also given on Object Windows Language (OWL), Karlsruhe Ontology (KAON), expressiveness, inference mechanisms, and support of exchange for ontology between applications.

42. The Million Book Project by the Ministry of Communication and Information Technology and the Carnegie Mellon University featured in the discussion. Under this project, one million books would be digitized. It was mentioned that digital library could be classified under two major categories: fundamental research and applied research.

43. In India, the morphology of words needs to be understood since it is a multi-lingual country. In the multilingual environment, knowledge access management is an extremely complex issue.

44. Another important issue that was touched upon was digital content management. There is an urgent need to have structured metadata. Digitization of books is the largest in India, while China is slowly trying to catch up. Open-system architecture provides a robust platform and the best selection of digital media management solution and development tools.

Digital Divide

45. The session began with a presentation on 'Extending Access and Impact of Western Journals in a Globalized Online World'. The origins of Scientific Technical and Medical (STM) Publishing and its growth in the 19th and 20th century, and the rise of the internet in the 1990s and its impact on online publishing were discussed. The session also focused on the 'unrest and innovation' in the publishing industry in the new millennium. It was felt that web publishing has given a new approach to building access, with low unit cost. Many institutions do not have enough infrastructures to sustain the movement. The role of Health Internetwork Access to Research Initiative (HINARI) in this context was discussed.

46. The role of other programmes like The Essential Electronic Agricultural Library (TEEAL) and that of open access and self-archiving was discussed along with their impact on scholarly publishing. It was felt that governments, publishers, and libraries from the West must continue to support distribution and access with fair pricing. The importance of information in empowering rural masses was emphasized upon and lack of knowledge in using Information and Communication Technologies (ICTs) was highlighted.

47. There are different methods for measuring digital inequality; there is a correlation between gross domestic product (GDP) and the density of internet usage. In this context, the role of libraries and research institutions for information dissemination was emphasized. The last part of the session focused on some historical perspectives. Many valuable manuscripts were destroyed during foreign invasions. The current scenario is very positive for growth of

information technology (IT). It was established that India is marching ahead in the IT sector and that the digital divide is decreasing.

Digital Library: Multi-lingual and Unicode

48. The session began with a discussion on multi-lingual document summarization – single or multiple types – for digital libraries. Such summaries could be categorized as extracts or abstracts. Different approaches to multi-lingual summarization were also discussed.

49. The following presentation focused on issues related to Indian languages in a digital library environment that aims at providing the entire metadata in the original language for global access and discussed the techniques employed, right from the selection of appropriate software to information management and retrieval in multiple language situations in UNICODE. The case of Central Institute of Indian Languages (CIIL) was cited as an example.

50. The session witnessed a discussion on script encoding, an area on which research has been concentrated. The issue of the need for a standard code for character encoding also came up for discussion during the session. The speaker also identified various issues like script encoding using Indian Script Code for Information Interchange (ISCII) and UNICODE.

51. A presentation was made on creation of metadata Extensible Markup Language (XML) files for digital preservation, which included a discussion on images in the True Type Font (TTF) format, their cropping and cleaning as well as optical character recognition (OCR). Special emphasis was placed on the development of OCR for Indian languages for easy content retrieval.

52. Recommendations made in the session were such as taking language- related issues pertaining to digital libraries and their problems seriously to bridge the digital divide, especially within a country with such multitude of languages. Further, information management in a multilingual environment can be carried out successfully by providing a perfect module to create a multilingual digital library under the purview of the National Resource Centre for Linguistics and Indian Languages.

Content Organization and Knowledge Management

53. The session began with a presentation on content organization and knowledge management in various libraries. It focused on digital library information repository data and information exchange on oceanographic or marine sciences. Exchange of information in wireless information networks and geo-references in text form were also discussed and debated. The basic aim of this session was to discuss how information has been exchanged among the general public and barriers to such exchange of information.

54. A detailed presentation was also made on the digital library information repository initiated by UNESCO as part of a project to facilitate and promote the exchange of oceanographic information. They are also responsible for various activities like workshops, advisory missions, internships, and regional ocean data and information exchange.

55. The session also focused on information systems with special reference to management of geo-referenced information, information available on wireless networks, and geo-references in text forms such as newspaper articles.

56. The discussion established a model for knowledge platforms in the form of a case study. Basic information requirements would be user-profiling and assigning base perceptions in form of tags and matching the users perception with the available information.

57. The session concluded with a presentation on the architecture of a digital library in P2P and mobile networks. This is a portable learning library, user-customized to provide semantic system overlap wherein information can be exchanged through wireless communication and also through the P2P system.

Digital Library and E-learning

58. The session discussed the learner centred approach in a virtual learning environment, the important components of a virtual learning include contents, services, and infrastructure. It also focused on learning and content management system, and major initiatives at the Indira Gandhi National Open University including Sakshat. Sakshat is a one-stop education portal developed

by the Ministry of Human Resource Development, and there was a detailed discussion on its features and components, including the challenges and issues involved.

59. The Makerere University Digital Library, Kampala, Uganda was focused upon with specific reference to challenges and barriers to digitization. Special attention was given to gender-specific challenges and opportunities in Uganda, connectivity, and high cost. There are many challenges in digitizing material, but the need of the hour is to overcome these challenges and so far movement was on the right track.

60. A case study was presented on Larsen and Toubro (L&T). It focused on e-learning information and knowledge management initiatives, enhancing human capabilities, and content creation in a corporate environment. A survey was conducted at the Utkal University on e-learning as a virtual media to meet future challenges. The problems and promises for the developing world were deliberated upon, with particular focus on the role of digital library in the developing world. The important parameters are collaboration, coordination, and synergy. The impact of digital libraries on higher education and research in Bangladesh was also highlighted.

User Studies and System Evaluation

61. The discussion highlighted several issues related to a digital library evaluation, and proposed a design methodology for practical digital library evaluation. The methodology was developed for assessing the value for money of Scottish Cultural Resources Access Network (SCRAN) a large-scale working digital library. The features of SCRAN could be employed by every digital library. A paper presented in the session focused on the experience of the Council of Scientific and Industrial Research (CSIR) in e-journal and consortium. The CSIR had assessed the usability of e-journals by using the Pavetu Law of 80:20 and lab-wise use pattern, which suggests addition of more resources relevant to the subject areas of less usage in a balance-striking manner.

62. E-Journal usage and the impact on the scholarly communications was also featured in the discussion. It was highlighted that the usage statistics provided by publishers indicate a huge growth in accessing these e-journals. A study has been conducted in this regard for the Tata

Memorial Hospital Library. The study pointed that most non-cited journals are e-journals. The session emphasized that there is also a need to evaluate the effectiveness of digital libraries. Some benchmarks for the evaluation of a digital library were proposed.

63. Participants also discussed on changes in users’ attitude in a hybrid context, citing the Guru Gobind Singh Indraprastha University (GGSIP) experience. During the course of the discussion, there was an attempt to define characteristics, building service system, usage of resources for reference service, information and cooperation of service, and formation of functions of service system.

64. The session concluded with a note that users’ needs are the main points to be taken into consideration, which leads to the satisfaction of users—the ultimate goal of a library.

Open Archives Initiatives and Institutional Repository

65. The session started with a presentation on the basics of open access. There was a discussion on the studies taken up by the Wellcome Trust, UK, in the area of publishing, keeping in view the economic aspects and seeking the alternative model presented during the second study of the Wellcome Trust. There was also a detailed discussion on the World Summit for Information Society conferences, the goals, objectives, and initiatives of which were described at length. The next part of the session revolved round the repository set up at National Informatics Centre (NIC), touching the subject of medical science. Copyright issue on open access was also discussed. There was a presentation on the initiatives taken to make Defence Research and Development Organisation (DRDO) publications online in the intranet mode through a customized version of e-print open access software. The last part of the session discussed the Indian Institute of Technology (IIT) Kanpur’s initiative for making theses and dissertations of the institute accessible using the D-Space Open Access institutional repository software. Scanning and preserving of documents on the quality mode were also discussed.

Digital Library and Sustainability

66. DLs are sustainable only if they are networked. The development of a global knowledge grid was proposed. It was mentioned that document delivery through the global knowledge grid

using info Asynchronous Transfer Modes (ATMs) is possible. There was a presentation on the economic issues in digital library. Since e-journals are quite popular among users, particularly young researchers, there should be a mechanism to negotiate the prices of e-journals. Also, to make the digital library movement sustainable, it was necessary to devise strategies. Rare and old material should be digitized.

Digital Library Services

67. There was a discussion at length on e-information services in the knowledge economy that started with ‘labour agriculture economy’. Highlighting the domain knowledge cycle and defining the facets of a digital library that comprise people, information resources, and technology, it was felt that there is a need to reorganize the information sources and services to meet various user needs by understanding them. Another presentation focused on online learning and its key features. The fundamental laws that influence ICT were elaborated upon and there was a detailed discussion on technologies like lightweight operating systems including Graphic Environment Operating System (GEOS), Network Computer Operating System (NCOS), Risc Operating System (RISCOS), and independent programming languages like Java, Java Script, and Visual Basic Script. The digital library initiatives in Nigerian and South African universities were compared and it emerged that the digital library initiatives in Nigerian universities lacked coordination.

68. The next part of the session focused on content management of the library web page at the Delhi College of Engineering (DCE), highlighting its unique features and also the e-services being offered to the user. The DCE web page has features like really simple syndication (RSS), searching forums, virtual reference desk, notice boards, document delivery service, think tank, and e-reference services. The last part of the session provided an overview of the DL initiative in Malaysia. Based on the evaluation of 12 university libraries and three research libraries, the session brought out various electronic services available. Libraries in Malaysia are getting digitized but the progress is slow due to lack of funds. There is also not much cooperation and collaboration among universities in Malaysia on DL services. There is a need to direct efforts towards an effective digital library project.

Digital Libraries: Semantics, Thesauri, Ontologies

69. The session highlighted digital libraries, semantics, thesauri, and ontologies. Types of indexing languages used, the relationship between human indexing and computer indexing, semantic web, semantic search implementation, intelligence search techniques, and other related issues were the focus of the session.

70. The first presentation discussed Koru – a web-based system that caters to the retrieval system as a whole. During the course of the presentation, the presenter explained the Key phrase Extraction Algorithm (Kea++ Algorithm) implemented for the Koru system. The traditional and digital library indexing system, human indexing, automatic indexing, and Letician chains were also elaborated upon.

71. The next presenter proposed a model for implementing semantic and ontology search on UGC-Infonet E-journal consortium by using automat, protégé, and Jena toolkit (Java).

72. The ongoing project at Tata Consultancy Services (TCS) focuses on ontology-based interaction in the multimedia collection. Content-based access to integrated multimedia libraries, inadequacy of traditional ontology in multimedia applications, and Multimedia Ontology Language for the Web (M-OWL) were also discussed.

73. The session ended with a talk on High-Level Thesaurus (HILT) – a distributed mapping-based subject inter-operability scheme, funded by the Joint Information Systems Committee (JISC), UK, and supported by Online Computer Library Centre (OCLC). In phase-II of the project HILT, the machine to machine (M2M) pilot architecture will be implemented till January 2007.

Digital Library: Country Report

74. The session focused on initialization and managing of the digital environment in some national libraries of India and across the world.

Appendix 'M'
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75. The first presentation emphasized on the digital environment in the National Library of India – one of the largest libraries in Asia. Modernization of the library and retro-conversion projects were discussed at length. The presenter gave a detailed account of 'Down the Memory Lane', a project of the National Library to conserve the cultural heritage of India by using image technology and to build the digital collection of the library. The selection procedure, scanning methodology, preservation of CDs, and the creation of metadata were also described.

76. The next presentation focused on French libraries and copyright laws. The French Copyright Bill, 2 protection measures for technological changes with implementation of free software, and specific acts of reproduction made by publicly accessible libraries, museums, or archives were also stressed upon.

77. Digitization initiatives in the National Library of Bhutan was the focus of the next presentation. The library has computerized holdings under the Danida Project. The library is actively working towards making available online data for researchers and texts for monasteries and temples.

78. The final presentation was on the digitization of the documentary heritage of Sri Lanka. The presenter spoke about the archival treasure in the country. The current trends in the digitization of the documentary heritage was also discussed in the course of the presentation.

Digital Preservation

79. The session began with a presentation on the principles of print media preservation, which could be applied to digital preservation. The presentation recommended the use of microfilm for this purpose. The life expectancy of 500+ years (hybrid solution) of the microfilm was taken into account. Mirroring data at different locations for its safeguarding and preservation was the other important suggestion made by the presenter.

80. The next presenter spoke on the long-term preservation of digital documents. Points of convergence, which include process and organization, metadata, and repositories, were also discussed. Issues like long term solutions for preservation, working with designers and users of

digital data, and legislation were also discussed. The presentation also touched upon challenges for preserving digital contents like technology, formats, copyrights, and IPR issues, and also gave an overview of various digital preservation strategies.

81. The next presentation titled 'Who Guards the Guards' gave a clear picture of the roles of libraries, archivists, copyright holders, networked information providers, and so on in safeguarding digital information.

82. The session concluded with a presentation on initiatives taken for long-term digital preservation in India and Germany. Various factors affecting digital storage and preservation like temperature, medium, and so on were also discussed at length.

DETAILS OF PANEL MEMBERS

Chair:

Mr Jaiinder Singh, IAS
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Joint Secretary
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Prof. P. Tapio Varis Ph.D.
Acting President, Global University System
UNESCO Chair in Global E-Learning with Applications to Multiple Domains, and
Professor and Chair of Media Education
University of Tampere, Finland

Mr Pavan Duggal
Advocate on Information Technology and Cyber Law
Supreme Court of India
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Mr Frank Vranken Peeters
Managing Director for Global Sales
Science and Technology, Elsevier Science
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Ms Kalpana Dasgupta
Former Director, Central Secretariat Library
New Delhi and
Former Librarian, National Library, Kolkata

Prof. Alan Hopkinson
Head of Library Systems, Learning Resources
The Sheppard Library
Middlesex University, UK

Prof. Om Vikas
Director
ABV Indian Institute of Information Technology and Management
Gwalior, MP

DETAILS OF POSTER PRESENTATIONS

Sl. No.	Title of the poster	Author(s)
1.	Parallel Interactions in Digital Libraries by Multiple Users	Alan W. Aldrich
2.	<i>Shaping Research to Adapt Integrated Approach on Digital Space – Portrayal and Salvage</i>	<i>Amutha Arunachalam and Dr.Ashok kumar</i>
3.	The Third Dimension	<i>Subhash Athavale</i>
4.	Needs of Digitization of Bibliographic Information	Dr. T. R. Borse
5.	E-publishing and copyright	Dr. Joginder Singh Burman
6.	CataractPortal : An Experience in Designing a Web Portal for Cataract Disease	Dr. V. Chandrakumar and Nirmala Krishnan
7.	Digital Preservation of Archives and Manuscripts in India	Dr. H.S.Chopra
8.	Digital Library Services in the Community Information Needs in Tribal Areas of Orissa	Ranjit Kumar Das, Prangya Das, Dr. U. C. Sharma, Dr. B. K. Choudhury and Gopabandhu Sahu
9.	Ergonomic Considerations in Information Center Design for Knowledge Workers: The Basic and Foremost Requirements for Effective Knowledge Management Works in a Digital Environment	Dr. Subarna Kumar Das and Sibsankar Jana
10.	<i>Designing of an Inventory Database using MS-Access software based on SQL platform for Citation Analysis of the Journal Publications of the Faculties of the Indian Association for the Cultivation of Science, an Autonomous Research Body under DST, Govt. of India</i>	Abhijit Dasgupta
11.	Use of Internet Information Resources and Digital Library Services by the Industrial Management Personnel in Dakshina Kannada District: a Critical Evaluation	Divakara and Dr. A K Baradol
12.	Digital Preservation	Babita Garg and Salek Chand
13.	<i>Medical Data Archive for Professional Education with HIS & Compatible PACS – Case Study of a GUI based Product.</i>	Geetha.G M and Suresh Kumar

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| 14. Semantic Web: Emerging Technology for Digital Library | Sumit Goswami, V Senthil and Ashok Kumar |
| 15. Extranet: An Essential Tool for Resource Sharing in Libraries | Amit Prakash Gupta |
| 16. Intelligent Life Long Learning Tutoring System for Eurasia Project | Prof. A. Kaklauskas |
| 17. Digital Library Services | Prayatkar K. Kanadiya |
| 18. Digital Resources of Nehru Library, CCS Haryana Agricultural University, Hisar: A Case Study | Kapila P C and Balwan Singh |
| 19. <i>Building Effective Document Repository based Digital Library for Organisations</i> | Tanay Krishna and Rakesh Kumar Thakur |
| 20. Role of University Libraries and Information Centres in Bridging the Digital Divide | Vinod Kumar |
| 21. Electronic Publishing and its Impact on University Li and Information Centres | <u>Vinod Kumar and Monika</u> |
| 22. User Studies and System Evaluation for Managing Digitized Technical Information : A Case Study with Real Estate & Construction Company | Mahesh Mathur, Pravin Choudhary, Prof.(Dr.) Shokeen Ashu and Mr. Partha Bhattacharya |
| 23. <i>E-Learning for Science Education in India</i> | Kinkini Dasgupta Misra |
| 24. <i>E-learning and Libraries</i> | D S Thakur and K S Thakur |
| 25. Library Buildings in the Digital Era | <i>Hadi Sharif Moghaddam</i> |
| 26. <i>Digital Libraries and Information Professional Skills</i> | <i>Shaista Muqueem</i> |
| 27. <i>Digitization of Vizag Steel Central Library & Digital Library Services</i> | <i>PSN Murthy</i> |
| 28. <i>Setting up an E-print Archive in Health Sciences Institutes: A model</i> | <i>Sangeeta Narang and KV Ratnakar</i> |
| 29. First Steps towards the Digital Ubiquitous Library | Dr. Oliver Obst |
| 30. Digital Libraries and their Services | H.B. Panchakshari and Tilottama B. Shirsath |
| 31. <i>Is Webliography an Effective Search Tool?</i> | Dr Pijushkanti Panigrahi and Sri Subir Das |
| 32. <i>Traditional Systems of Knowledge Organization in the Digital Environment</i> | Kamani Perera |

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| 33. Online Information System A Case Study on SVIMS | B.Prasad, S.A.A.Latheef & G.Subramanyam |
| 34. Library Information System (LIS), Software of the FHS Library, Aga Khan University, Karachi: An Evaluation | Syed Attaullah Shah and Azra Qureshi |
| 35. Secure Virtual Private Network Using IPsec | Y.P. Raiwani and Harish Sharma |
| 36. Development of Digital Library: Issues, Opportunities and Challenges | <i>Dr. P. Venkata Ramana</i> |
| 37. Usage of E-journals, Publications and Research Trends in a Research Organization – A Case Study | D. B. Ramesh |
| 38. Knowledge Sharing: the Pragmatic Approach | M. Ramshirish |
| 39. WeBlog: A Tool for Communication and Information Dissemination | T Koteswara Rao and Satyajaya Satpathi |
| 40. Facilitating Research – Digital Library Services of University of Madras | Dr.R.Samyuktha |
| 41. Digital Information and the Library Professional : Bangladesh Perspective | Md. Abu Sayeed |
| 42. E-learning: Potential and Perspective | Satyajaya Satapathi |
| 43. IT, E-Learning and Academic Development | Dr. C.K Sharma, Amit Kumar Sharma and Bhuvanesh Bakshi |
| 44. Introducing Institutional Repositories in University and Institutional Libraries of India for Open Access | Dr. Manoj Kumar Sinha |
| 45. Defining the Role of Ontologies in Digital Libraries: Evolving a Model with Faceted Approach | Aparajita Suman |
| 46. Native American Indian Tribal Libraries and the Digital Divide | James Thull |
| 47. NuclearMedi: Web portal for Sharing Information Resources among Nuclear Medicine Specialists | Dr Rajeev Vij |
| 48. <i>Evaluation of Hybrid Library based on User Satisfaction: A Case Study of CES Library @ IISc.</i> | Yashwant G Kanade and Chudamani K.S. |

DETAILS OF PRODUCT PRESENTATION

Sl.No.	Publishers/Vendors	Presentation Features
1.	American Society of Civil Engineers, USA	Overview of online Journals, global marketing and sales status
2.	American Society of Mechanical Engineers, USA	Overview of online journals and present offers for India
3.	BMJ Publishing Group, UK	New e-services offered particularly for medical professionals
4.	Cambridge Scientific Abstracts, USA	CSA abstract service and contents of Illumina database
5.	Elsevier India	Overview of Science Direct databases, Indian market share and status
6.	Global Information Systems Technology Pvt. Ltd., (GIST), India	Functions of GIST and details of online journals available with its publishers
7.	Institute of Electrical and Electronics Engineers, Inc. (IEEE), USA	Overview of all online journals, 20 specific Engineering and Power journals, sales and market status globally.
8.	Oxford University Press, UK	Online journals and database, Global sales and marketing status, dictionaries, e-books, e-services offered and their delivery options.
9.	Science, USA	Overview of the magazine 'Science', its global sales and marketing.
10.	Taylor & Francis Group, India	Online journals, marketing status in India

DETAILS OF EXHIBITORS

1. Publishers

- (a) American Society of Civil Engineers, USA
- (b) ASME International, USA
- (c) Association for Computing Machinery, USA
- (d) Blackwell Publishing, UK
- (e) BMJ Publishing Group, UK
- (f) Cambridge University Press India Pvt. Ltd, India
- (g) CSA Journals & CSA Illumina Databases, USA
- (h) ebrary, USA
- (i) Ebsco Publishing, India
- (j) Elsevier India (Science & Technology), India
- (k) Emerald Group Publishing Ltd., India
- (l) Global Information Systems Technology, Pvt. Ltd, India
- (m)Globe Publications Pvt Ltd, India
- (n) Institute of Electrical and Electronics Engineers, Inc., USA
- (o) Indlaw Communications Pvt. Ltd., India
- (p) McGraw-Hill Digital, Singapore
- (q) Nature Publishing Group, India
- (r) Oxford University Press, UK
- (s) Project Muse USA
- (t) Science, USA
- (u) Springer (India) Private Limited, India

(v) Taylor & Francis Books India Pvt Ltd, India

2. Software

(a) Beegees Computers Pvt Ltd, India

(b) LibSys Corporation, India

(c) Soft Aid Computers Pvt. Ltd, India

3. Equipment Manufacturer: M/s Ankita Enterprises, India demonstrated DL accessories for digitization.

RECOMMENDATIONS

Preamble

1. The Conference recognizes that global access to information is essential for economic, cultural, social, scientific and technological development.

2. The Conference recognizes that universal access to information is essential to freedom, equality, global understanding, peace, poverty alleviation, economic growth, education, health, sanitation, global e-commerce, and transparency in governance.

3. The Conference recognizes that the 21st century is the era of knowledge economy wherein technology and knowledge are prime factors of production and services, wherein business activities, products and services as well as management and decision making are knowledge and technology driven. In the knowledge-based economy information and knowledge are corporate assets.

4. The Conference recognizes that digital libraries are the tools to facilitate global access to information, and a positive force to advance learning, scholarship, and knowledge innovation.

5. The Conference recognizes that world over several initiatives have been undertaken to promote and advance global access to information. However barriers such as copyright issues, economic issues, rapid changes in technology, band-width limitations, lack of trained manpower, and multilingual contents continue to hamper progress in this regard.

6. The Conference recognizes that information decays rapidly in the digital age and as such majority of publications lose their commercial value long before the expiry of the mandated copyright period under the Law.

7. The Conference recognizes that factors to promote global access are content creation; Web based dissemination; information literacy; network connectivity, reliability, capacity and performance; and technical, telecommunications and bibliographic standards.

Recommendations

8. Having regard to the strengths and potentials of digital libraries, and their role in economic, cultural, social, and technological development and having regard to the barriers to global access to information, the Conference recommends the following:

- (a) Enact Digital Library Act.
- (b) Establish Consortia for Content Creation.
- (c) Budgeting.
- (d) Democratization of Information.
- (e) Capacity and Capability building in digital library.
- (f) National digital library policy.
- (g) Digital India Initiative (DII).

9. Enact Digital Library Act: Countries should endeavour to enact Digital Library Act aimed at facilitating digitization and content creation for universal access to information. This is a new concept and India should provide the leadership by enacting first Digital Library Act which provides for

- (a) Differential reduction in copyright period for all kinds of publications.
- (b) Vesting copyright to the authors.
- (c) Publicly funded materials should be freely accessible.
- (d) Build in clear and extensive provisions for fair use of copyrighted material.
- (e) Develop new models of stated-funded compensation to the authors.
- (f) Compulsory deposit of digital copy of new publications in addition to printed copy.

10. Establish Consortia for Content Creation: Countries should strengthen content creation activity by establishing consortia for content creation aimed at

- (a) Capturing traditional knowledge that still has not been recorded but resides within the communities.
- (b) Archiving cultural assets of the country like songs, music, folklore, speeches, etc.
- (c) Archiving scholarly publications.
- (d) Building repositories of scholarly publications, government publications and reports, institutional reports, etc.

11. Budgeting: Certain percentage of budget meant for education sector must be earmarked exclusively for content creation.

12. Democratization of information: Countries should aim at democratization of information so that the information at the point of use is available for free. In this regard following measures are important
 - (a) Place all contents on the Internet.
 - (b) Make provision for Internet access for through public library system
 - (c) Establish network of community knowledge centres
 - (d) Make access user friendly, tailoring it to the needs of individuals
 - (e) Promote information literacy in accordance with UNESCO declaration
 - (f) Use open access and open source technologies for information dissemination

13. Capacity & Capability Building in Digital Library: To meet the manpower demand for establishing, developing, and expanding digital library activities, there is an urgent need to build new capacities and capabilities. In this regard, the countries need to set up institutions of excellence. Such institutions can take up following different approaches to curriculum development, education, research and training in digital library field
 - (a) Create a new discipline labeled 'digital library studies' which would be a symbiosis of knowledge components from the fields such as library science, knowledge management, scientometrics, management, and computer science.
 - (b) Create programmes under the Ministry of Culture for education and training of in-service staff in digital library
 - (c) Introduce specialization in digital library studies for teaching in universities
 - (d) New models of teaching such as e-learning, virtual classrooms, virtual reality may be exploited for building capacity and capability building
 - (e) Sufficient funding may be provided for such programmes

14. National Digital Library Policy: Developing countries need to formulate a national digital library policy as well as establish an apex national body to provide leadership in digital library development, and to coordinate, direct and oversee disparate efforts in content creation, and catalyze digital library activities within the country

15. Digital India Initiative (DII) 2006: India in particular should launch this initiative for undertaking the following programmes in collaboration with leading countries in digital library world

- (a) Enactment of Indian Digital Library Act.
- (b) Establish Consortia for Content Creation.
- (c) Democratization of Information.
- (d) Build Capacity and Capability in Digital Library.
- (e) Formulate National Digital Library Policy.

16. Apex Body: A separate apex national body for the development of DL in the country should be set up and a separate 'fund' for the purpose should be created.