



Taking Pride in Legacy

Libraries and Archives for Viksit Bharat

— Editors —

Ramesh C. Gaur
Kumar Sanjay
Ajit Kumar
Mukesh Kumar



**Central Government Library Association
(Delhi Branch)**



**Indira Gandhi National Centre
for the Arts**

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●———— Preface ————●

The Central Government Library Association (CGLA) has consistently taken a leading role in promoting dialogue and collaboration among library and information science professionals. We are proud to present the proceedings of the 6th International Conference of the Central Government Library Association, themed **“Taking Pride in Legacy: Libraries and Archives for Viksit Bharat,”** which took place from October 17th to 19th, 2024. This year’s theme emphasises the belief that libraries and archives transcend their function as mere knowledge repositories; they are essential for preserving a nation’s cultural heritage, history, and values. As India makes strides toward becoming a Viksit Bharat (Developed India), libraries and archives are key players in empowering communities, fostering intellectual growth, and contributing to nation-building by celebrating and safeguarding our legacy. The conference convened distinguished scholars, librarians, archivists, policymakers, and professionals from around the globe to engage in discussions on the evolving roles of libraries and archives in the digital era, strategies for safeguarding cultural and historical records, and the integration of technology to improve accessibility and outreach. It was inspiring to witness a vibrant exchange of innovative ideas, best practices, and success stories—insights that will undoubtedly motivate future initiatives in this vital field.

The proceedings encapsulate the intellectual richness and diversity of the conference, highlighting research papers, keynote speeches, panel discussions, and case studies presented by participants. These contributions underscore the multifaceted roles of libraries and archives in nurturing intellectual curiosity, preserving cultural heritage, and contributing to the advancement of a progressive society. We sincerely thank the organising committee, sponsors, and participants whose dedication and enthusiasm made this event a resounding success. Special acknowledgement goes to the authors and presenters for their invaluable scholarly contributions and to the editorial team for their diligent efforts in compiling these proceedings. As you engage with the pages of this publication, we hope you discover insights and inspiration that will further the mission of libraries and archives in promoting Viksit Bharat. Let us take pride in our collective legacy and work together to ensure its preservation and promotion for future generations.

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Part A





Report of the Conference

Report of the Rapporteur General on Fifth International Conference of Central Government Library Association (CGLA) on the theme of “Taking Pride in Legacy-Libraries and Archive for Viksit Bharat, 17th-19th October, 2024 at New Delhi.

K.N. Jha

Assisted by Dr. Vinod Kumar, Ms. Nutan Kumari, Dr. Rakesh Pal, Ms. Bhupinder Walia

SUMMARY OF THE REPORT

The Fifth International Conference of CGLA, on the theme of **Taking Pride in Legacy-Libraries and Archive for Viksit Bharat**, was organised in collaboration with the Indira Gandhi National Centre for Arts (IGNCA), Ministry of Culture, Government of India, New from 17th-19th October 2024. The conference venue was the Samvet Auditorium, IGNCA, Janpath Building. New Delhi.

Three day’s conference, 17th-19th October, 2024

Total number of participants = 167

Total number of Research papers registered = 20

Total number of papers presented during the conference= 20

Total number of invited Expert talks = 34

Day one, i.e. 17th October 2024, was dedicated to Pre-Conference Brainstorming Sessions.

The conference was held on 18th and 19th October 2024.

Total number of sessions in three days = 18

Total number of Technical Sessions = 8

Panel discussion sessions = 6

Product demonstrations = 15

Total number of invited talks during the conference = 24

HIGHLIGHTS OF THE SESSIONS

The 5th International Conference of Central Government Library Association (CGLA) 2024 has been organized in collaboration with the Indira Gandhi National Center for Art, Ministry of Culture, Government of India, Delhi, on the theme of **“Taking Pride in Legacy-Libraries and Archives for Viksit Bharat”** from 17th to 19th October 2024 at Samvet Auditorium, IGNC, New Delhi.

17th October 2024

The first day of the three-day conference was dedicated to Pre-Conference Brainstorming on 17th October 2024. The Pre-Conference was inaugurated by the Chief Guest, Dr. G. Mahesh, Chief Scientist Head DGED, CSIR, New Delhi, in the presence of Prof. (Dr.) Ramesh C. Gaur (Conference Chairman), Sh. Kumar Sanjay, Director, NITI Ayog, Dr. Ajit Kumar, Director, CSL (Organizing Secretary), Mukesh Kumar, LIO, Election Commission of India (President, CGLA, Delhi Branch), Rapporteur, Shri K.N. Jha, Assistant Professor, DLIS, DSEU, New Delhi.

Two brainstorming sessions and two panel discussions were organized on the day. The first brainstorming session was dedicated to issues and challenges in managing and digitalizing microfilm, print materials, and manuscripts, while the second session was on cloud technology and the library. The Panel Discussions were dedicated to **GILNET: One Government, One Library and Challenges and Opportunities in Government Libraries**.

18th-19th October 2024

The conference was inaugurated on 18th October 2024 by the lightening of lamps by the Chief Guest, Ms. Lily Pandeya, Joint Secretary, Ministry of Culture, Government of India, in the presence of Guest of Honour, Ms. Deepika Pokharna, Deputy Director General, SATCOM Monitoring Centre, Dept of Telecommunications, Government of India, and Prof. (Dr.) Ramesh

Gaur (Conference Chairman) Director Kalanidhi and Dean (Admin) IGNC, New Delhi, Dr. Kumar Sanjay (Organizing Secretary) Director, NITI Ayog, New Delhi, Dr. D.K. Pandey, President CGLA, Dehradun.

The guests, dignitaries and delegates were welcomed by Sh. Kumar through his welcome address. Further, the dignitaries on the dais were felicitated by Dr. Gaur, along with Shawl, Bouquet, and Memento.

In the inaugural address, Ms. Pandeya said that the library is the safest place in the community and does not discriminate or differentiate on the grounds of caste, creed, or gender. She mentioned that the nation's development cannot be visualized without the support of the library system. There is an urgent need to have a concrete plan and its execution to strengthen the library system, support the vision of the government of India, and contribute to nation-building. She also added that the library should be developed to support high-end research and innovative work as well as a community place for the citizens of the nation.

Ms. Pokharna said that the development of the nation can't be realized without developing villages. We need to bring library systems and services to the village level to develop villages. We have the technology now, especially 5G, through which we can reach a far-flung area of our country and support them with our services.

During the inauguration session, the CGLA conferred different Awards for the year 2024 under the category of Best Librarian and Best Library. The Central Secretariat Library, Ministry of Culture received the Best Library Award, Lifetime Award given to Dr. Arun Kumar Chakravarty (Netaji Open University, Kolkata), Best Library Professional-General to Dr. A.K. Suman (IGNFA), Best Library Professional- Technical Award to Mr. Mukesh Kumar (ECI), Best Young librarian award to Dr. E. Gajalakshmi (NSD) and Mr. Rahul Kumar (PM Museum and Library) and Best Librarian technical to Mukesh A. Pund (CSIR).

Awards were given to the awardees by the Chief Guest and the Guest of Honour. Vote of thanks by Shri Kumar Sanjay.

The Session concluded with the National Anthem.

During the conference, the Technical Sessions were dedicated to the following topics:

1. Best practices in libraries.
2. India's initiative on technology-based library services: National Digital Library of India.
3. Access and Management of Government Data.
4. Data security
5. Innovation and challenges in government libraries and archives.
6. Emerging technologies, especially Artificial Intelligence and its Applications in Library.

Invited Talks

In these three days of the conference, 34 experts from research organizations, government libraries, IITs, Universities, and the corporate world delivered invited talks on issues of libraries, emerging technologies and their application in overcoming the challenges in libraries and archives.

Paper Presentation

Scholars from different libraries, research organizations and universities presented 20 research papers at the conference.

Product Demonstration

Companies providing library materials, technologies, machines, equipment, etc., demonstrated their products and services to the delegates. Representatives of fifteen companies came with their products and services to the conference.

Open Discussion and the Summary of the Recommendations

The last session of the conference was dedicated to open discussion, during which all the experts discussed the recommendation to be presented to the authorities to achieve the goals of the conference.

Valedictory Session

The concluding session of this three-day conference took place as a Valedictory Session. The Chief Guest of the Session was Shri Ram Bahadur Rai, the President of the IGNC, Guest of Honour Prof. K.P. Singh from the Department of Library and Information Science, University of Delhi, Shri Sachidanand Joshi, Dr. Ramesh C. Gaur, Shri Kumar Sanjay and the K.N. Jha, the Rapporteur General.

The conference was concluded with a vote of thanks to the dignitaries, the delegates, collaborators, sponsors, organising committee members and all contributors who contributed directly or indirectly to the success of the conference, followed by the felicitation to committee members and certificate distribution.

DETAILED REPORT ON PRE-CONFERENCE BRAINSTORMING SESSION HELD ON 17TH OCTOBER 2024

The programme started with the registration of the delegates at 09:00 AM at the Samvet Auditorium, IGNCA, Janpath Hotel, New Delhi.

Inaugural Session

Session Started @ 10:00 am

Chairperson: Prof. (Dr.) Ramesh C. Gaur, Conference Chairman.

Chief Guest: Dr. G. Mahesh (Head DGED, CSIR, New Delhi)

Welcome Address: Dr. Kumar Sanjay and Dr. Ajit Kumar (Organizing Secretary),

Introduction to CGLA: Dr. D.K. Pandey (President CGLA, Dehradun)

Rapporteur: Shri K.N. Jha (Rapporteur General)

The Pre-Conference Brainstorming Session was inaugurated by the Chief Guest, Dr. G. Mahesh (Head DGED, CSIR, New Delhi), in the presence of Prof. (Dr.) Ramesh C. Gaur (Conference Chairman), Sh. Kumar Sanjay and Dr. Ajit Kumar (Organizing Secretary), Mukesh Kumar (President, CGLA, Delhi Branch), Dr. D.K. Pandey (President CGLA, Dehradun) and Shri K.N. Jha (Rapporteur General).

Dr. Ajit Kumar welcomed all the dignitaries on the dais, delegates and scholars in the Pre-Conference Brainstorming Session of the 5th International Conference of the CGLA. He said that libraries are a treasure of our heritage and the history of our ancestors. We need to know this treasure to move forward. He said that the role of libraries and archives has become more important in digital India, and we must provide citizens with access to this knowledge. He said that our children should know the history of our civilisation, culture and knowledge heritage preserved in our libraries and archives. He thanked all the participants and delegates for sparing time for this three-day conference.

Dr. D.K. Pandey welcomed the dignitaries and delegates at this conference on behalf of the CGLA. He said that the Chief Guest, Dr. Mahesh, has put a visible mark on the horizon of the library in the country as the coordinator while he was the coordinator of the National Knowledge Consortia. He shared the circumstances in which the Central Government Library Association was born. He expressed his hope that the Pre-Conference

Brainstorming Session would be fruitful in making efforts to contribute to the vision of Viksit Bharat.

Dr. G. Mahesh, the chief guest, expressed his gratitude to the Organising Committee of the Conference for inviting him on the occasion. He said that he went through the structure of this three-day event and found it well-crafted and in the right direction. On the concept of **One Nation, One Library**, he said that the idea of **One Nation, One Subscription** looked absurd at its initial phase, but we succeeded and realised the idea. Likewise, the idea of One nation, one library can be realised. He congratulated the conference committee and office bearers of the CGLA and wished for the success of the conference.

Dr. Ramesh C. Gaur welcomed all the dignitaries on the dais and participants of the conference. He said this conference needed to realise our Prime Minister's vision of "Pride in Legacy". He said that in this brainstorming session, we will discuss issues of our Government Libraries and Archives and finalise the strategy to contribute to the vision of Viksit Bharat.

Shri Kumar Sanjay welcomed all the dignitaries and delegates to the conference. He said there is an urgent need to integrate all the Government Libraries and create a Government Library Network to provide access to the invaluable knowledge preserved in the libraries and archives of the Central government and state governments. He said that the government of India took many steps to strengthen the libraries and archives, like the Knowledge Commission, Library Cell at the Central Secretariate Library, Library Legislation, GILNET, etc., but the pace is so slow that it is not visible on the ground. Hence, it is an urgent need for all the experts in government libraries and archives, academicians, technocrats and library authorities to come together and work in mission mode to make our library system strong enough to provide access to every citizen of India, whether it is rural or urban.

Award: Sri Mukesh A. Pund, Senior Scientist, NIScPR, CSIR, New Delhi, was conferred with the Best Librarian Technical for 2024. Mr. Pund thanked the Award Committee and the CGLA for conferring this award to him.

Shri Mukesh Kumar extended the vote of thanks to the chief guest, dignitaries, collaborators, sponsors, media persons and delegates.

The session was concluded with a tea break.

BRAINSTORMING SESSION-1

Session Started @ 11:00 AM.

The Theme of the Session: Digitisation of documentary heritage **Chair Person:** Dr. D.D. Lal, Librarian, NBRC, Manesar, Haryana **Cochair Person:** Dr. Alka Rai, DL, Ambedkar University, New Delhi

Presenter: Mr. Jason Przybylski, Associate Director, Infrastructure Services Outreach, ITHAKA

Topic: Explore generative AI on JSTOR: Advance your institution's digital initiatives on JSTOR (Guest Lecture) Issues/Challenges and solutions Microfilm (ii) Print Material (iii) Manuscript

Product Demonstration

1. Contentra Technologies for Digitisation, New Delhi
2. Kibo, Bangalore.

Rapporteur: Sh. Rakesh Kumar Pal, ALIO.

Proceedings

Mr. Jason Przybylski presented his talk on exploring generative AI on JSTOR: advance your institutions' digital initiative on JSTOR. He said that the generative AI in JSTOR will assist libraries and archives in processing their digital collections. The technology will drastically reduce the time and resources required for librarians to process large collections. It will allow librarians to focus on more advanced metadata creation and preservation tasks. He said that the generative AI will enhance the speed of generating metadata compared to librarians.

Sri Jitendra Kumar demonstrated the digitisation services as a product of M/s Contentra Technologies for digitisation in New Delhi.

Ms. Noor Jahira demonstrated Kibo's product in Bangalore.

The session was concluded with a felicitation to the Chair, Co-chair, Rapporteur, expert and representatives of the two companies.

BRAINSTORMING SESSION-2

Session Started @ 12:15 AM.

The theme of the Session: Libraries on Cloud/Cloud Technology

Chair Person: Shri Mukesh Pund, Chief Scientist, NIScPR, CSIR, Delhi

Cochair Person: Dr. Parveen Babbar, DL, JNU, New Delhi

Invited Experts

1. Dr. Lata Suresh, HOD, ICAI, Manesar
2. Mr. M.K. Chettiar, CEO of Bharat Book
3. Sh. Mukesh Kumar, LIO, Election Commission, New Delhi

Product Demonstration

1. Celect Pvt. Ltd.
2. Zero Net Libraries Presentation by Net-Zero Ltd.

Rapporteur: Shri K.N. Jha, Asst. Prof., DLIS, DSEU, New Delhi.

Proceedings

The session started with the welcome to the Chairperson, Co-Chair Person, and Experts. The chairperson presented the outline of the session. He said that cloud computing has given us the power to use server space optimally. He shared his experience of the Knowledge Gateway project of the CSIR. He said that only three servers played the role of 54 servers in this project because of cloud computing technology.

Dr. Lata Suresh said that we were not able to record all events in our history. We were very rich in knowledge but did not record everything. We find references but not the actual record. This digital technology has allowed us to record each event of an individual, community, nation, and world, and the cloud has given us the power to make it available to the world in 24x7 mode. Though there are issues of data security and unwanted attacks on servers, these are part of the game. The technologists work day and night to keep data safe on the cloud while attackers work to breach the safety wall. This war will continue in cyberspace.

Mr. M.K. Chettiar said that the benefit of the cloud is that we can access information 24x7 worldwide. He took the example of newspaper archives, as users can access hundreds and thousands of newspapers on one

platform, and that's been the case for many years. This technology has allowed libraries and archives to make their resources available to their community worldwide.

Mr. Mukesh Kumar mentioned the challenges associated with the cloud and the problem faced by the library and archive in making their resources available on the cloud. He said that the moment you make your resources available on the cloud, unwanted attacks occur, ultimately increasing the traffic on your server, and sometimes your server crashes. He suggested that library professionals should at least always take backup every day. If possible. It should be taken twice daily and kept safe on offline memory devices or computers.

The product demonstration was presented by the representatives of M/s Celect Pvt. Ltd., a company providing less expensive AI-based solutions to RFID and Net-Zero Ltd., providing net-zero or green building solutions to reduce carbon footprint and reduce energy consumption in the building.

The session was followed by the question-answer session where delegates asked questions on challenges they are facing in putting their data on the cloud, data security, achieving zero carbon goals in their libraries and archives, etc., and experts discussed the solutions.

Dr. Praveen Babbar, in his concluding remarks, said that cloud computing technology has matured now. We are in a position to provide our patrons with seamless services. He thanked the organising committee, Chairperson, all experts and representatives from companies for their presentations.

The dignitaries, expert speakers and representatives of the two companies were felicitated by the Organizing Secretary, Sh. Kumar Sanjay and Ms. Gajalakshmi.

The session was concluded, and the delegates proceeded to Lunch.

PANEL DISCUSSION-1

Session Started @ 2:30 pm

Theme: GILNET: One Government One Library

Chair Person: Prof. (Dr.) Ramesh C. Gaur, Director & Head, Kalandidhi Division & Dean (Administration), IGNC, New Delhi.

Co-Chair Person: Shri Kumar Sanjay, Director (Library), NITI Aayog.

Expert Speakers

1. Shri Mukesh Pund, Chief Scientist, CSIR, Delhi
2. Prof. Arun Kumar Chakraborty, Head DLIS, NSOU, Kolkata
3. Dr. Ajit Kumar, Director, CSL, M/o Culture
4. Dr. Ramesh Yernagula, Director (Library), M/o External Affairs.

Rapporteur: Dr. E Gajalakshmi, Librarian, NSD

Proceedings

Dr. Ramesh C. Gaur highlighted the efforts made to overcome the issues related to the libraries of the Government of India. He said that many steps had been taken in the past, such as Knowledge Mission, GILNET, and Library Cell at the CSL, to address the issues of libraries under the central government. But issues are still pending. We have expertise in our government library system, and the only need is to move in the right direction and get support from a higher level of authority. He opened the discussion and requested the expert to prepare a concrete proposal and strategy to strengthen our library system to contribute to the mission of Viksit Bharat. He said that the vision of Viksit Bharat can't be achieved without a strong library system in our country.

Shri Kumar Sanjay introduced the concept of GILNET, the concept of One Nation, and One Library. While elaborating on the concept, he said every library must share data and resources on one platform without losing its identity. Each will run as an independent unit, while through technology, they will be connected, and services can be provided across the network as one library. For this purpose, an independent GILNET will be created, and it will work as a coordinator among the government libraries.

Dr. Ajit Kumar said that the Central Secretariat Library will play a positive role in establishing the GILNET. He said due to different administrative reasons, the responsibilities of CSL were delayed for the holistic development of the Indian Library System, but now he is trying his best to start all the projects, whether the National Knowledge Mission, Library Cell, Training of the Library Professionals, etc.

Shri Mukesh Kumar said that the GILNET is possible using KOHA and Dspace software. We have the properties within our Government Libraries to successfully establish and run this Network.

Shri Mukesh A. Pund said that the technology is available, and we can achieve this concept. There is a need for positive efforts in this direction and support from the government.

Dr. Ramesh Yernagula expressed his thoughts that bringing all the libraries from different ministries and departments is possible when there are directions from the PMO. Otherwise, inter-ministries and inter-department coordination will be difficult.

Dr. Arun Kumar Chakraborty said that the concept of GILNET is very much achievable and will strengthen the government library system to work as one library while its own special characteristics remain intact. He said there is an urgent need to work in this direction to strengthen the library system and provide seamless service to the nation.

The session concluded with remarks by the Chairperson that a recommendation in this regard and other issues should be drafted and presented to higher authorities to make GILNET a successful concept and address all issues that are barriers to the strong government library system.

The session concluded with the felicitation of the experts with angavastram, mementoes, and a conference kit.

PANEL DISCUSSION-2

Started @4.00pm

Theme: Challenges and Opportunities in Government Libraries

Chair Person: Shri Kumar Sanjay, Director (Library), NITI Aayog.

Co-chair: Dr. A.K. Suman, LIO, IGNEA

Expert Speakers

1. Dr. Ajit Kumar, Director, CSL, M/o Culture
2. Dr. S. Sivprasad, PLIO, National Library & Director, CRL, Kolkata
3. Dr. D.K. Pandey, Librarian, Dehradun
4. Dr. K.K. Singh, LIO, IPC, Ghaziabad
5. Sh. Amit Prakash Gupta, LIO, UPSC, New Delhi

Rapporteur: Ms. Yogita Ahuja, Dy. Director(Library), BIS, New Delhi

Proceedings

Shri Kumar Sanjay, Director (Library), NITI Aayog, opened the session by emphasising the significance of modernising and integrating government libraries across India. His keynote focused on the implementation of GILNET: One Government, One Library, a strategic initiative aimed at unifying and digitising government libraries under a single network to streamline access to information and resources. He further encouraged the panellists and participants to share their thoughts on both the challenges faced and the potential opportunities that could arise from implementing this initiative. He emphasised creating a cohesive library system supporting India's broader digital transformation goals under the *Digital India* initiative.

Dr. A.K. Suman underlined government libraries' critical role in supporting policy development, research, and public administration. He highlighted several challenges faced by institutions, including:

- **Fragmentation of Resources:** Government libraries often operate in silos, with limited collaboration or resource-sharing mechanisms in place.
- **Lack of a Centralised System:** Accessing cross-departmental information remains inefficient and cumbersome without a unified platform.
- **Outdated Infrastructure:** Many government libraries have not kept pace with technological advancements, limiting their ability to offer digital services.

Shri Kumar Sanjay, Director (Library), NITI Aayog, advocated for the GILNET initiative to integrate all government libraries into a single digital platform to address these issues. This would facilitate resource-sharing and enhance collaboration across departments and ministries, leading to more efficient governance and decision-making.

He further encouraged the panellists and participants to share their thoughts on both the challenges faced and the potential opportunities that could arise from implementing this initiative.

Participants Views

Ms. Nutan Kumari, LIO, M/o Corporate Officer, New Delhi, highlighted that there is a Lack of Uniformity in the Library Cadre. The libraries are suffering because of not recruitment of staff, posting of non-professionals in the library and lack of promotion and vertical growth of library staff.

Mr. Rakesh Kumar highlighted the disparities in the designations, roles, and responsibilities of library professionals across different government bodies. For instance, a Librarian in one government institution may hold a different rank, pay scale, and set of responsibilities compared to another institution despite performing similar functions. This inconsistency often leads to confusion and dissatisfaction among library professionals.

Ms. Divya underlined inconsistent Pay Scales and Promotion Criteria. Most of the participants raised concerns about the lack of standardisation in pay scales and promotion policies.

Dr. S. Sivprasad discussed the issue of disparities in recruitment procedures and training programs across government libraries. He observed that some libraries have rigorous recruitment criteria and provide extensive training, while others lack structured processes and opportunities for skill enhancement. This creates a fragmented workforce with varying levels of expertise.

Sh. Amit Prakash Gupta pointed out that library professionals in some departments receive less compensation and fewer opportunities for advancement compared to their peers in other government sectors. This inequality discourages talent retention and professional growth within the library community.

Dr. D.K. Pandey added that standardising the library cadre system would also promote professional mobility, allowing librarians to move between departments without facing discrepancies in roles or pay.

Dr. Ajit Kumar, after analysing the views of panellists and participants, provided the following recommendations:

- (a) **Mandatory Library Ranking and Census:** A comprehensive library census would provide an accurate and up-to-date account of the number, type, and status of libraries across the country. This data would serve as the foundation for strategic decision-making, resource allocation, and policy formulation. These measures are vital to ensuring that libraries remain integral to the nation's knowledge infrastructure.
- (b) **Need for Library-Specific Policies and Acts:** Just as the National Education Policy (NEP) and UGC Acts have brought reforms and standardisation to the education sector, there is an urgent need for national library policies and acts to bring uniformity in pay scales, designations, and cadre structures across government libraries. A

National Library Policy would establish clear guidelines and standards governing library professionals' roles, responsibilities, and career progression, ensuring equity across all institutions. The formulation of such policies would address long-standing disparities in compensation and opportunities for advancement, providing a cohesive framework for recruitment, training, and promotions. Uniformity in these aspects is essential to enhance the professional status of librarians and ensure that they are recognised as key contributors to educational and intellectual development.

(c) Establishing an Accreditation Body for Government Libraries:

One critical suggestion was the creation of an **accreditation body** for government libraries. This body would be responsible for setting standards and evaluating the quality of library services, infrastructure, and resource management across all government institutions.

- (i) Accreditation would ensure that libraries meet consistent benchmarks, promoting excellence and accountability. Additionally, this body could serve as a **platform for library professionals**, providing a space to become aware of their rights, present their concerns, and seek solutions. A formal structure for addressing grievances and advocating for professional development would strengthen the library community and give it a unified voice.

- (ii) Regular Training for Technological Adaptation.

As libraries evolve in the digital age, **regular training** for library professionals is identified as a critical need. With the rapid pace of technological advancements, it is essential for librarians to stay updated on new tools, systems, and practices in digital library management. Continuous professional development programs, workshops, and certification courses in areas such as digital archiving, data management, and e-library services would enhance the capacity of library staff to adapt and excel in a technology-driven environment.

During the panel discussion on government libraries, several key recommendations were made to address challenges and leverage opportunities in the sector. These include the establishment of an accreditation body, platforms for professional advocacy, the need for regular training, and fostering collaboration.

Key Points

- Government libraries need an accreditation body, a platform should be there so that library professional are aware of their rights, present their issues and get solutions.
- Regular training for library professionals is crucial to adapt to technological advancements.
- Collaboration with NGOs, educational institutions, and government bodies can help overcome resource shortages.
- Library ranking and library census are mandatory to protect this profession.
- Like the National Education Policy and the UGC Act, library policies and acts should be prepared to bring uniformity in pay scale, designation and cadres.

The panellists urged all attendees to support libraries and proactively advocate for their essential societal role.

Conclusion

The panel emphasised that mandatory **library ranking, library census,** and the creation of **library-specific policies and acts** are indispensable for bringing structure and consistency to the library profession. These initiatives will not only protect the profession but also ensure its sustainable development in line with the broader goals of national progress and knowledge empowerment.

The session was concluded with thanks to the Chairperson, Co-chairperson, Rapporteur, and the expert panellists. All the dignitaries on the dais were felicitated with angavastram, mementoes and the Conference Kit.

Concluding Session of Pre-Conference

Dr. E. Gajalakshmi, librarian at NSD, New Delhi, presented the summary of the inaugural session, two brainstorming sessions, and two-panel discussions. She thanked the Chief Guest for the pre-conference, Dr.

Mahesh, and all dignitaries, experts, panellists, rapporteurs and participants from government libraries, research institutions and academia.

The day was concluded with the request for tea and snacks to all participants and dignitaries.

Detailed Report on Two-Day Conference 18th-19th October 2024

Registration Started @ 9 AM.

Chairperson: Prof. (Dr.) Ramesh C. Gaur (Conference Chairman) Director Kalanidhi and Dean (Admin) IGNC, New Delhi.

Chief Guest: Ms. Lily Pandeya, Joint Secretary, Ministry of Culture, Government of India.

Guest of Honour: Ms. Deepika Pokharna, Deputy Director General, SATCOM Monitoring Centre, Dept of Telecommunications, Government of India.

Dignitaries on Dais: Shri Kumar Sanjay (Organizing Secretary), Director, NITI Ayog, New Delhi and Dr. D.K. Pandey, President CGLA, Dehradun.

Inaugural Session of the Conference, 18th October 2024

The inaugural Session was held @ 10:00 AM in the Samvet Auditorium, IGNC, Hotel Janpath, New Delhi. The conference was inaugurated by the lightening of lamps by the Chief Guest, Ms. Lily Pandeya, Joint Secretary, Ministry of Culture, Government of India, in the presence of Guest of Honour, Ms. Deepika Pokharna, Deputy Director General, SATCOM Monitoring Centre, Dept of Telecommunications, Government of India, and Prof. (Dr.) Ramesh C. Gaur (Conference Chairman) Director Kalanidhi and Dean (Admin) IGNC, New Delhi, Shri Kumar Sanjay (Organizing Secretary) Director, NITI Ayog, New Delhi, Dr. D.K. Pandey, President CGLA Dehradun.

Shri Kumar Sanjay welcomed the guests, dignitaries, and delegates through his welcome address. Further, the dignitaries on the dais were felicitated by Dr. Gaur, along with Shawl, Bouquet, and Memento.

Ms. Pandeya in her inaugural address, said that the library is the safest place in the community and it does not discriminate or differentiate on the grounds of any caste, creed or gender. She mentioned that the development of the nation cannot be visualised without the support of the library system. There is an urgent need to have a concrete plan and its execution to strengthen the library system, support the vision of the government of India, and contribute to nation-building. She also added that the library should be developed to support high-end research and innovative work as well as a community place for the citizens of the nation.

Ms. Pokharna said that the development of the nation can't be realised without developing villages. To develop villages, we need to bring library

systems and services to the village level. We have the technology now, especially 5G, through which we can reach a far-flung area of our country and support them with our services.

During the inauguration session, the CGLA conferred different Awards for the year 2024 under the category of Best Librarian and Best Library. The Central Secretariat Library, Ministry of Culture, received the Best Library Award, Lifetime Award given to Dr. Arun Kumar Chakravarty (Netaji Open University, Kolkata), Best Library professional-General to Dr. A.K. Suman (IGNFA), Best Library Professional Technical Award to Mr. Mukesh Kumar (ECI), Best Young Librarian Award to Dr. E. Gajalakshmi (NSD) and Mr. Rahul Kumar (PM Museum and Library) and Best Librarian_Technical to Mukesh A. Pund (CSIR).

The Chief Guest and the Guest of Honour gave awards to the awardees. Shri Kumar Sanjay proposed a vote of thanks. He thanked the Chief

Guest, Ms. Pandeya, Guest of Honour, Ms. Pokharana, Chair Person of the Session, Dr. Gaur, Dr. Pandey and all dignitaries for sparing their time for this conference. He expressed his gratitude to this conference's resource persons, delegates and participants. He thanked IGNCA, sponsors and all the direct and indirect contributors for their efforts to organise this conference and make it successful.

Ms. Yati Sharma and Dr. E Gajalakshmi coordinated the Session.

The session concluded with the National Anthem, and then the delegates proceeded to high tea.

TECHNICAL SESSION – I: PLENARY SESSION

The session started @ 11:50 AM.

Theme: Best Practices in Libraries and Archives

Chair Person: Prof. (Dr.) Ramesh C. Gaur, Director & Head, Kalanidhi Division & Dean (Administration), IGNCA, New Delhi.

Co-Chair Person: Ms. Shompa Das, Scientist F, IITM Pune.

Panellists

1. Dr. B. Sutradhar, Librarian, IIT Kharagpur, NDLI
2. Dr. Nabi Hasan, Librarian, IIT Delhi
3. Dr. Anil Kumar Dhiman, Information Scientist, Gurukul Kangri, University, Haridwar

Rapporteur: Dr. Vinod Kumar, Librarian, Dyal Singh College, Delhi

PROCEEDINGS

The Session started with the Opening remarks of the Chairperson, Dr. Gaur. He said that the technologies have enabled us to design and deliver innovative services to the patrons of the library and bring visibility to the hidden knowledge treasured in our libraries and archives. He requested all the panellists to present the best practices in their organisations and for their observations to be replicated in other libraries and archives.

Dr. Sutradhar explained the project of the National Digital Library of India. He said the IIT Kharagpur, being the nodal agency of this project, it worked from inception to execution and further maintenance of the National Digital Library of India. The IIT Kharagpur found that the existing software was unsuitable for the project. Hence, the software was developed in-house, hardware was procured and installed, and we started to create digital content, processed it to make it accessible and put it in the public domain. The content is presently in 12 languages and meant for children from nursery to higher studies students and high-end researchers and scientists. Resources in the NDLI are categorised for school, college, university students, competitive examinations, etc. The search engine is interactive. Students and all citizens of India should visit this portal for information. He also requested all the professionals of the Library and Archive to promote these resources to their patrons through their libraries and archives and also contribute to making the digital collection of the nation rich.

Dr. Nabi Hasan presented his views on smart Government Libraries. He said that the customer is the boss. Innovate yourself, take proactive steps in designing library products and services, reach out to patrons, and save their time and energy in finding appropriate information and technology, which has enabled us to deliver our services to their doorsteps. He gave a visual presentation of the IIT Delhi Library and many other libraries in the world that provide innovative services to their patrons.

Dr. Dhiman stressed the need to strengthen the public library system in our country. He suggested that existing schools, colleges and university libraries should open the door to the local public. If academic libraries start to serve the local public, then the need for public libraries will be reduced. He said that he has experimented at his university and opened his university library to the local public. There is an overwhelming response from the people in the vicinity of his university.

Ms. Das also presented her case study and best practices adopted in the IITM library in Pune.

The session was concluded with thanks to the chairperson, co-chairperson, and panellists, and congratulations to all dignitaries with angavastram, mementoes, and a conference kit.

PRODUCT DEMONSTRATIONS

The Session Started @ 1.00 PM

Chair Person: Shri Munesh Sen, LIO, CSL, New Delhi

Co-Chair Person: Shri Akhlaq Ahmad, Librarian, AIIMS, Patna.

Companies and Products

1. Indiatat, Product-statistical data and databases
2. Total IT, Product-Technological Solutions to libraries and archives
3. Magzter, products – content databases, especially content in Indian languages

The session was concluded with thanks to the Chairperson and congratulations to the dignitaries on the dais, panellists, and representatives of the companies.

The delegates and participants proceeded to Lunch.

Technical Session II: Panel Discussion

The Session Started @ 2.30 PM

Theme: Access Management of Government Data

Chair Person: Dr. Narendra Kumar, Ex Librarian, University of Delhi

Co-Chair Person: Dr. Jyanendra Narayan Singh, Librarian, Dyal Singh College (Evening)

Panellists

1. Dr. Shatanu Ganguly, Director (Library), Ashoka University
2. Dr. Munish Jindal, CEO, Hover Robotix
3. Dr. Prabhakar Singh, Vice President, CMIE

Rapporteur: Rajesh Kumar Pandey, Librarian, Sanskrit University, Delhi

Proceedings

The session started with a welcome to the Chairperson, Co-chairperson, Rapporteur and panellists of the Session. In the opening remarks,

Dr. Narendra Kumar said that data is the gold of the present society. Government organisations produce terabytes of data every day, which are very important for governance, research, and economic activities. Hence, data management from the collection, standardisation, storing, and retrieving is very important. He welcomed all the panellists and requested them to present their views on the topic.

Dr. Shantanu Ganguly elaborated on various dimensions of the data governance framework. Referring to the Report published by the NITI Aayog on the SDG India Index in 2023, he emphasised the significance of government data and how the data carries the values for different decision-making. Dr. Ganguly not only highlighted the importance of data but also explained the nitty-gritty of data framework and delved into the key pillars of data framework: data policy, data standardisation, data quality, data security and privacy, data compliance, etc. He deliberated his thoughts on seven dimensions concerning the purpose of the data governance framework and highlighted that data is essentially required for strategic, tactical, and operational decision-making. Further, he detailed the different challenges, citing many examples towards implementing the data governance framework in India. Lastly, he presented his case study on SIROs (Scientific and Industrial Research Organisations) and highlighted the methodology for the government data collected and utilised for different purposes by the Government of India.

Dr. Munish Jindal, CEO of Hover Robotix, highlighted numerous examples of personal data tracking in our digital lives, underscoring the omnipresence of data-tracking systems. His concern about the urgent need for a robust mechanism to ensure the security and privacy of personal data was a key takeaway from his address.

Shri Prabhakar Singh, Vice President of CMIE, Centre for Monitoring Indian Economy, expressed his thoughts on access to government data. He said that the mechanism should be Interactive and effective. He said that there is a need for data to be standardised and authenticated. He stressed that the value of data increases when it is available for use. However, the sensitivity of data must be looked into. He also shared his views on the issues concerning access versus control of data.

The session was concluded by Dr. Jyanendra Narayan Singh, who thanked the chairperson and expert panellists. The dignitaries on the dais were felicitated by the angavastram, mementoes and the Conference Kit.

TECHNICAL SESSION -III

Session Started @ 3.30 pm

Theme: Innovations and Issues in Archives and Government Libraries

Chairperson: Dr. Arvind Kumar, Member Secretary, NCF

Co-chair Person: Dr. Meena Kandwal, Director, Rajya Sabha, New Delhi

Expert Speakers

1. Prof. (Dr.) Ramesh C. Gaur (Mapping of Archives in India)
2. Dr. Meena Gautam: Archival Science Education in India
3. Dr. Heather Brown, Librarian, Australia
4. Sh. Vikas Kumar, LIO, PMML: A Case Study of Digitisation of India House Collection, PMML.

Rapporteur: Ms. Malvika Kishor, Librarian, Navodaya Vidyalaya

Proceedings

Dr. Arvind Kumar introduced the topic to the panellists. The library and archives are going through different challenges at different levels. Some libraries have innovatively tried to find a solution to the problem of the library, while other libraries are suffering from the same problem. He requested the panellists to concentrate on some concrete issues and their solutions.

Dr. Heather Brown expressed her view on disaster management in libraries and archives. The reasons for disaster can be anything from natural to manmade. Climate change is becoming the biggest cause of disaster worldwide. Risk is always there, whether it is the physical or digital collection. The physical resources can be saved from disasters through precautionary steps. Digital resources can be saved technologically, but keeping a backup of digital resources is always recommended. Innovation and training are needed in disaster risk management.

Dr. Meena Gautam explained the state of archival education in India. He said that the induction of archival science in India started in 1993 as a one-year diploma programme, and many short-time courses were offered to the professionals in the School of Archival Studies. He said there is an

urgent need to expand Archival Education in India to fulfil the needs of Archival professionals.

Dr. Meena Kandwal said that the Parliament Library is the second largest library in India. The library mainly caters to the needs of parliament members. The library has also prepared the paper-less who's who of the Rajya Sabha, and more steps have been taken for proceedings, etc.

Shri Vikas Kumar presented his case studies at the Prime Minister Museum and Library, New Delhi. He presented a complete process and workflow for preserving archival materials and a digitisation project to create a digital archive.

Dr. Gaur concluded the session. He said that there is an urgent need to map archives in India. He thanked the chairperson, expert panellists, and dignitaries on the dais, and after felicitation, the dignitaries on the dais were given the angavastram, mementoes, and the Conference Kit.

PRODUCT DEMONSTRATION

Chair: Dr. Akhlaq Ahmad, Librarian, AIIMS Patna

Companies

1. **Stata by Systech**
2. **Statista**
3. **Statcraft**

The Product demonstration session was concluded with thanks to the Chairperson and the representatives of the companies. The Chairperson and the representatives of the companies were felicitated with the angavastram, mementoes and the Conference Kit.

TECHNICAL SESSION - IV

The Session Started @ 5.00 PM.

Chairperson: Dr. D.K. Singh, Librarian, BHU

Co-chairperson: Dr. Jyotsna Arora, Deputy Director, ICHR

Rapporteur: Ms. Nutan Kumari, LIO, M/o Corporate Officer, New Delhi

Paper Presentation

1. **Application of ChatGPT in Libraries:** A Way Forward by Mohammad Asif, Dr. K.K. Singh and Rajeev Singh Raghuvanshi.
2. **Accessibility and Technical Efficiency of WEB-OPAC in the South- Asian National Libraries:** An Evaluative Study by Nabanita Roy & Mithu Anjali Gayan.
3. Latest Trends and Techniques in Library Science by Raj Kumar Raja and Badal Kumar Thakur.
4. **Transforming Library and Information Services Delivery through Innovative Technologies:** A Case Study of the Ministry of External Affairs Library. Mr. Prasanth Singh, Dr. Payal Singh and Ramesh Yernagula.
5. Importance of Licensing in Acquisitions of E-resources Amit Prakash Gupta and Dr. B.J. Anuya.
6. **Bridging the Knowledge Gap:** Developing Sustainable Models for Inf. And Viksit Bharat, Yogita Ahuja.
7. **A New Approach to Circulation, Tracking Inventorying, and Security of Library Materials:** using RFID Technologies by Jawed Akhtar and Shesh Mishra.

Proceedings

1. **Application of ChatGPT in Libraries: A Way Forward** Presented by Mohammad Asif, Indian Pharmacopoeia Commission, MHFW, Ghaziabad, UP, India.

These findings suggest that the application of ChatGPT in libraries offers significant potential for improving both user experience and internal operations, but it requires thoughtful implementation and ethical oversight to ensure it complements traditional library services effectively.

2. **Accessibility and Technical Efficiency of Web OPACS in South Asian National Libraries: An Evaluative Study/** Nabanita Roy, Tripura University.

It examines the technical performance and feature availability of Web OPACs across 5 Asian National Libraries-India, Sri Lanka, Bhutan, Bangladesh and Nepal- excluding 3 due to Web OPZAC inaccessibility and inclusivity features with performance metrics analysed using Google Page Speed Insights.

3. **Latest Trends and Techniques in Library Science/** By Badal Kumar Thakur, Univ. of Allahabad.

The Paper explores the cutting-edge trends and techniques shaping the field of Library Science in the digital age.

4. **Transforming Library & Information Services Delivery through Innovative Technologies: A Case Study of the Ministry of External Affairs Library/** By Ms. Payal Singh (ALIO), Ministry of External Affairs Library.

She highlighted the innovative practices adopted by the MEA Library to meet the growing needs of its users.

5. **Licensing Agreement of E-Resources in Library/** By Sh. Amit Prakash Gupta, LIO, UPSC Library.

Mr. Gupta presented the licensing process and challenges while procuring e-resources in libraries. He also provided solutions to each challenge in the acquisition of e-resources.

6. **Bridging the Knowledge Gap: Developing Sustainable Models for Inf. And Viksit Bharat/** By Yogita Ahuja DD, Bureau of Standards.

She discussed the 4 pillars of Viksit Bharat Yuva, Garib, Nari Shakti and Annadata. The objectives of the study are to assess the current state of information access /Libraries in orphanages and conclude that Libraries are vital for bridging the knowledge gap in orphanages.

Key Goals of this Technical Session Include:

1. **Improving Access to Information:** Investigating how technologies like AI, cloud computing, and big data analytics help libraries provide faster, more accurate, and more personalised access to vast digital collections.
2. **Enhancing User Experience:** Understanding how emerging technologies such as augmented reality (AR), virtual reality (VR), and mobile applications can offer interactive and engaging ways for patrons to explore library resources.
3. **Automating Library Operations:** Exploring automation tools like robotic process automation (RPA) and AI-driven cataloguing to streamline routine tasks, such as inventory management, lending, and resource organisation.
4. **Facilitating Remote and Inclusive Services:** Examining technologies like virtual reference desks, e-books, and digital lending platforms that allow libraries to reach users beyond physical spaces, ensuring inclusivity and accessibility for all.
5. **Data Management and Digital Preservation:** Assessing how libraries can use technologies like blockchain, AI, and advanced digital archiving systems to effectively and securely manage digital collections.
6. **Collaboration and Resource Sharing:** Studying how technologies such as cloud-based library management systems and global digital repositories promote collaboration among libraries, enhancing resource sharing across institutions and geographical boundaries.
7. **Challenges and Future Directions:** Identify the challenges libraries face in adopting these technologies—such as budget constraints, training needs, and digital literacy—and discuss potential future developments in library services.

Conclusion

This objective aims to showcase how libraries are evolving into dynamic, technology-driven hubs that continue to play a vital role in education, research, and community development in the digital age.

The session concluded with the felicitation of the paper presenters, chairperson, co-chairperson, and rapporteur. The delegates and participants proceeded to Tea.

Tea Break

AGM: CGLA

The CGLA AGM took place at 6.00 PM.

Cultural Programme

The cultural programme began at around 6.30 PM and continued until PM. The performing troop featured different folk dances of India.

Dinner

The dinner was served to the guests, delegates and all participants, followed by the conclusion of the Cultural programme.

October 19, 2024

TECHNICAL SESSION-V: PANEL DISCUSSION

The Session Started @ 10.00 am

Theme: Emerging Technologies in Smart Libraries

Chairperson: Dr. Akhtar Parvez Librarian, Jamia Milia Islamia, New Delhi

Co-chairperson: Dr. P.K. Chaudhary, Librarian, NSUT

Invited Experts:

1. Dr. M Veeramani, Librarian, IUK, Kuwait
2. Dr. Sanjay Kataria, Librarian, Benett University
3. Dr. Sanjeev Kumar, Librarian, Ambedkar University, New Delhi
4. Dr. Priya Rai, Librarian, National Law University, Dwarka, New Delhi

Rapporteur: Shri Avinash Kumar, Librarian, Sahitya Akademi

Proceedings

The session commenced with a warm welcome from the chairperson, Dr. Akhtar Parvez. He initiated the discussion on the topic “Emerging Technologies in Smart Libraries.”

Dr. Neeti Saxena highlighted that the British Council operates in 100 locations worldwide across 37 countries. She discussed the need to

integrate various services offered by the British Council to meet the specific needs of library users. Dr. Saxena emphasised the importance of digital libraries, RFID technology, and the delivery of high-quality services. She further elaborated on initiatives such as storytelling sessions, book readings, and ensuring the safety of children within library premises. Dr. Saxena stressed the Council's commitment to building strong bonds with readers and library clientele. Additionally, she noted the growing sensitivity towards celebrating Black History Month globally. As part of its services, the British Council also offers top-tier translation solutions, strengthening its role in promoting inclusivity and accessibility in education.

Dr. Sanjeev Kumar emphasised the evolving focus from automation and digitisation to augmented technologies and artificial intelligence. He stressed the importance of librarians acquiring IT skills to build smart libraries and highlighted the need to connect users directly with libraries, making them integral to the institution. Dr. Kumar also recommended conducting SWOT analyses to enhance existing services. While AI and RFID can support infrastructure development, he noted that only librarians, through proactive use of IT tools, can effectively engage readers.

Dr. P.K. Chaudhury shared his experience, noting that while data collection is happening, its effective utilisation for broader purposes is often overlooked. He pointed out that the academic field faces numerous challenges today, which government libraries are also likely to encounter. Dr. Chaudhury emphasised the importance of categorising information and organising collected data to address these challenges efficiently.

Dr. Sanjay Kataria expressed his gratitude to the organising committee. He observed that smart libraries represent not only the application of technology but also require proper etiquette, manners, and respectful engagement with readers. He stressed that creating a smart library necessitates a deep understanding of advanced technologies like AI and augmented technologies. He warned that libraries often occupy large spaces and involve considerable investments, emphasising the need for careful planning in modern library design. He pointed out that developed countries have integrated robotics in libraries for years. He also raised a key challenge for library managers: with tech-savvy users already equipped with advanced tools on their devices, what incentives can

libraries offer to attract them physically? Addressing this challenge, he concluded, is essential for the future of libraries.

Dr. Priya Rai shared her insights, emphasising that librarians must adopt an adaptive approach. She explained that when a superior assigns

a task, they generally do not expect a refusal. In such situations, the only acceptable response is Yes, I will do the work. She further highlighted the importance of continuous learning and unlearning to enhance skills. She stressed the significance of intelligent search through cloud technology and mobile-based platforms, which are essential in today's dynamic environment. She also underscored the need to stay updated with global trends in library and information science, as AI has become integral to these advancements. She said that chatbots are no longer just future technology—they are already a vital part of our daily lives. Moreover, organisations like OCLC are leveraging AI to improve the speed and quality of cataloguing services. In conclusion, she said that the challenges surrounding copyright, intellectual property rights (IPR), licensing, and agreements continue to pose significant concerns in the library and information science field.

The session was concluded by thanking the dignitaries on the dais and felicitating them with angavastram, mementoes and conference kits.

The delegates and participants proceeded to tea.

TECHNICAL SESSION-VI: PANEL DISCUSSION

The session Started @ 11: 30am

Theme: AI Implementation in Libraries

Chairperson: Dr. Usha Mujoo Munshi, Librarian, IIC, New Delhi

Experts Panellists

1. Dr. Shuktij Singh Rao, Former Exec. Director, CII
2. Prof. (Dr.) Sherin Zafar, Jamia Hamdard
3. Dr. Gitanjali Yadav, Sr. Scientist, NIPGR
4. Sh. Viplav Baxi, COO, Knimbus
5. Dr. Aakash, Librarian, NCERT
6. Dr. Neeraj Singh, Deputy Librarian, Punjab University, Chandigarh

Rapporteur: Dr. Chhaya Singh, Library and Documentation Officer, ICRIER, New Delhi.

Proceedings

Dr. Munshi opened the panel discussion with her opening remarks on AI applications and implementations, benefits and challenges, in libraries.

She talked about analyses of big data and maintenance. She said that the data is crucial for the development of the society. She opened the floor for the panellists with remarks on data mining, data citation protocol and AI technology.

Dr. Rao said that AI technology helps in information search and retrieval. He said that AI-enabled tools facilitate access to the multilingual collection and real-time translation of contents, transcribing audio and video, etc. He said that the libraries can harness the benefits of AI through its critical applications.

Dr. Yadav talked about the key challenges of AI. She emphasised the democratisation of knowledge. She said that AI should be part of the education system and be tough in every state and institution.

Dr. Zafar about the impact of AI in daily life. She suggested that libraries can develop small apps in different languages to enable better library services. She said that AI can also manage big data by retrieving appropriate information.

Shri Baxi talked about how libraries can contribute to the Large Language Model. He suggested that libraries should use AI as creators, curators, and facilitators.

Dr. Akash emphasised the ethical challenges of AI.

Dr. Neeraj Singh said that AI could help libraries improve services, but reliable sources should always be referred to as depending on AI analyses, which may become fatal as reliability on the AI, especially in research, may be fatal.

The session was concluded by thanking the dignitaries on the dais and felicitating them with angavastram, mementoes and conference kits.

TECHNICAL SESSION -VII: PAPER PRESENTATION

The Session Started @ 12.30 PM

Chairperson: Dr. S.S. Dhaka, Ex-Director, M/o External Affairs

Co-Chair Person: Dr. Uma Tyagi, Librarian, Patel Chest Institute, Delhi

Rapporteur: Dr. Nivedita Sharma, Librarian, Janki Devi College, University of Delhi

Paper Presentation

1. Smart Libraries, Ms. Ritu & Mr. Kshitiz Bhardwaj.
2. Role of INFLIBNET in the Capacity Building of LIS Professionals: A Comprehensive Overview from University Librarian Dr. Rajesh Kumar Pandey, Prof. J.N. Gautam.
3. Developing Core Leadership Competencies for the Library Profession, Rakesh Kumar Pal.
4. Entrepreneurship in Library and Information Science (LIS): An Indian Perspective Kripa Nand Jha and Dr. Madhusudhan.
5. Bibliometric study of research output of (IITM), Shompa Das and Suresh Kumar
6. Artificial intelligence literacy in India Academic libraries: Exploring the insights from Library Professional Dr. Rajeev Mishra.

Proceedings

The chairperson, Dr. Dhaka, welcomed the co-chairperson, rapporteur and all the researchers whose research papers were listed for presentation.

Ms. Ritu said the smart library makes learning easier through physical and online resources. She said that the libraries can be smarter using AI and IoT.

Shri Jaikrishna presented the paper “Role of INFLIBNET in the Capacity Building of LIS Professionals: A Comprehensive Overview from University Librarian” on behalf of Dr. Rajesh Kumar Pandey, Prof. J.N. Gautam. He emphasised the role of INFLIBNET in the capacity building of library professionals. He said that INFLIBNET organises the training programme in 13 universities in India.

Mr. Pal talked about the competencies required by modern-day librarians, as well as managerial skills and a service mindset.

Mr. Jha said that the Government of India promotes entrepreneurship, and to create an entrepreneurial mindset, entrepreneurship has been brought into education. The UGC, AICTE, and the Ministry of Skill Development and Entrepreneurship of the Government of India are working to develop every field of study at schools, technical institutes, and higher studies institutions. NEP 2020 has emphasised skill, innovation, and entrepreneurship, which has also made it a focus area in education. He talked about the opportunities in the field of Library and Information Science. He listed business opportunities in core library services,

peripheral to library and information science fields, and some futuristic business opportunities. He also talked about the challenges of establishing a sustainable business in LIS-related products and services.

Ms. Sompal Das presented her bibliometric studies of the research output of the scientists of IITM. She presented the library services of the IITM

during the COVID period and the research publications of scientists during the period. In her findings, she said that the output of the researchers has grown, and their publishing patterns have changed. The impact factor of the Institute has grown.

Ms. Poonam presented her research on the Indian library system and the impact of technology on libraries.

Dr. Rajeev Mishra presented his paper on Artificial intelligence literacy in academic libraries in India.

Product Demonstration:

1. Knimbus
2. Turnitin

The session was concluded by thanking the dignitaries on the dais, representatives of companies, and researchers, who were felicitated with angavastram, mementoes, and conference kits.

The Delegates and Participants proceeded to lunch.

TECHNICAL SESSION -VIII: PAPER PRESENTATION, INVITED TALK AND PRODUCT DEMONSTRATION

The session started @ 20.15 PM

Theme: Issues in Public Libraries / Contemporary Issues

Chairperson: Dr. Neeraj Kumar Chaurasia, DL, IIT Delhi

Co-Chair Person: Dr. Narendra Kumar Rawat, Librarian, Hansraj College

Invited Talk

1. Dr. Neeza Singh, Librarian, Chandigarh
2. Shri Sanjay Kumar Bihani, High Commission of India, Dhaka, Bangladesh
3. Prof. Arun Kumar Chakraborty, Head, DLIS, NSOU, Kolkata.

Rapporteur: Dr. Chhaya Singh, Librarian, ICRIER, Delhi

Paper Presentation:

1. **CORAL: An Electronic Resource Management System, its usages in Libraries** Shubhankar Ray Choudhary
2. **Transforming Services through Integrating Modern Technology and Increasing Digital Literacy by Introducing New Tools: A Case Study of IITM Library** Uday Suresh Deoghar and Mrs. Shompa Das
3. **3. Reflections on Delhi University Collage Libraries in India: Accessibility and Inclusivity** Malavika Kishore and Dr. Sanjay Kumar Pandey
4. **Awareness of Information Literacy Programs: A Survey of National Law University of North India** Dr. Sonam Singh & Dr. Shalender Singh Chauhan
5. **Online Presence of Faculties at Dr. R.P. Centre for Ophthalmic Sciences: AIIMS, New Delhi: A Google Scholar Visibility Study,** Umesh Kumar and Dr. Margam Madhusudhan

Proceedings

The chairperson welcomed all the dignitaries and researchers in this session. In his opening remarks, he said that public libraries are facing tremendous challenges related to staff, technology implementation, budget, etc. In such circumstances, for survival, libraries need to be smart enough to deal with challenges and provide appropriate library services.

Dr. Neeza Singh said that public libraries need to become a public hub, a commonplace, and a community space. He presented the innovative programmes undertaken by her library to increase footfall. She talked about community programmes and awareness programmes, such as senior citizen home visits and transgender orientation programmes. She talked about the challenges of her library and the measures she has taken.

Mr. Bihani stresses resource sharing among libraries as they suffer from the resource crunch in staff, budgets and other things.

Prof. Chakraborty said that public libraries are needed to connect with the community to bring them into the library. It should help the young generation in jobs and career-making. It should create space for everyone in the community, including children, young people, and old people.

Paper Presentation

Mr. Choudhary presented his paper titled “CORAL: An Electronic Resource Management System, its Usages in Libraries”.

Uday Suresh Deoghar presented a paper entitled “Transforming Services through Integrating Modern Technology and Increasing Digital Literacy by

Introducing New Tools: A Case Study of IITM Library jointly authored by Uday Suresh Deoghar and Mrs. Shompa Das.

Malavika Kishore presented a paper entitled “Reflection on Delhi University Collage Libraries in India: Accessibility and Inclusivity jointly authored by Malavika Kishore and Dr. Sanjay Kumar Pandey.

Dr. Sonam Singh presented a paper entitled Awareness of Information Literacy Programs: A Survey of the National Law University of North India jointly authored by Dr. Sonam Singh & Dr. Shalender Singh Chauhan.

Umesh Kumar presented his research work entitled “Online Presence of Faculties at Dr. R.P. Centre for Ophthalmic Sciences: AIIMS, New Delhi: A Google Scholar Visibility Study” jointly authored by Umesh Kumar and Dr. Margam Madhusudhan.

The session concluded with thanks to the chairperson and congratulations to the experts and researchers for the invited talk, along with angavastram, mementoes, and a conference kit.

OPEN DISCUSSION AND SUMMARY OF RECOMMENDATIONS

The Session started @ 3.15 PM

Chairperson: Prof. (Dr.) Ramesh C. Gaur

Co-chair Person: Dr. A.K. Suman, Librarian, IGnFA Dehradun

Rapporteur: Dr. E. Gajalaxmi, Librarian, NSD

Expert Panellists

1. Sh. K.N. Jha, Associate Professor, DSEU: Presentation of Conference Report
2. Sh. Kumar Sanjay, Director (Library), NITI Aayog, New Delhi
3. Dr. Ajit Kumar, Director, CSL, M/o Culture, New Delhi

Proceeding

The session started with welcoming Chairperson Dr. Ramesh C. Gaur, Co-chairperson Dr. A.K. Suman, Rapporteur Dr. E. Gajalakshmi and Panellists Shri K.N. Jha, Shri Kumar Sanjay and Dr. Ajit Kumar.

Dr. Gaur opened the session with remarks that in the last three days, we have discussed issues, challenges, and solutions for government libraries and archives through different expert talks, panel discussions, and technical sessions. He requested the house to raise any issues if we need to pay attention to strengthening the government libraries and museums.

Most of the questions from the delegates from different libraries and archives of ministries and departments were related to the staffing formulae for libraries and archives, uniform recruitment rules, career advancement policy, lack of training for the library and archives staff, library cadre, etc.

Dr. Gaur said there are Ranganathan formulae for determining staff strength and further the recommendations of the Chattopadhyay Committee. However, there has been no notification from DOPT, UGC, AICTE, or any other government body. We are going to include these issues in our recommendations and find a way to solve them to strengthen the libraries and archives of ministries and departments. He further requested Shri K. Jha to present a summary of recommendations in the house and then ask for suggestions from the house.

Shri Jha presented the summary of the recommendations as:

1. There is an urgent need to establish GILNET to network all the libraries of different ministries and departments of the Government of India.
2. A separate institution, GILNET, under the guidance of PMO, may be created to network resources, libraries and archives of the Government of India.
3. The GILNET should provide technical infrastructure. Support and expertise are needed in the libraries and archives to unify the services from one platform, share the resources, and take steps to make the concept functional.
4. A Census of libraries and archives may be conducted urgently.
5. Revival of Knowledge Commission.

6. Under the DOPT, a library cadre should be created to address the issues of library staff, to avoid recruiting the staff on deputation from one department to another, unified Recruitment Rules across the ministries and departments, formulation of rules for determining the number and levels of Library and Archive Professionals in a particular library and archive, career advancement scheme and nodal agency (maybe Central Secretariate Library, IGNCAL, etc.) at regional level in the country for providing in-service training for professional development and promotion purposes.
7. Any other steps deemed fit to strengthen libraries and archives to make their resources available to ministries and departments for decision-making as well as to the citizens of India for education and research purposes.

The house accepted the recommendation unanimously and requested that the senior professionals working at higher levels and the office bearer of the CGLA put their efforts into achieving these recommendations.

The session was concluded thanks to the Chairperson, other dignitaries on the dais, and all the delegates and participants for contributing to finalising the recommendations.

VALEDICTORY SESSION

Valedictory Session@ 4:00 PM

Chief Guest: Shri Ram Bahadur Rai, Chairman, IGNCA.

Guest of Honour: Dr. K.P. Singh, Professor, DLIS, University of Delhi

Chairperson: Dr. Sachidanand Joshi, Member Secretary, IGNCA,

Conference Chairman: Prof. (Dr.) Ramesh C. Gaur

Rapporteur General: Shri K.N. Jha

Organizing Secretary: Sh. Kumar Sanjay, Organizing

Proceedings of the Session

Dr. E. Gajalakshmi, the coordinator of the session, requested the Chief Guest, Shri Ram Bahadur Rai. Guest of Honour Dr. K.P. Singh, Chairperson of the Session Dr. Sachidanand Joshi, Conference Chairman Dr. Ramesh C. Gaur, Rapporteur General Kripa Nand Jha and Organizing Secretary Shri Kumar Sanjay welcomed on the dais.

Dr. Gaur welcomed the chief guest, guest of honour, chairperson of the session rapporteur general and organising secretary on the occasion. The Guest of honour, Dr. K.P. Singh, was felicitated with a shawl, bouquet, and mementoes by Dr. Gaur and Kumar Sanjay. Dr. Gaur and Kumar Sanjay also felicitated Shri Rai and Dr. Joshi with bouquets, shawls and mementoes. Sri Kumar Sanjay felicitated Shri Jha and Dr. Gaur with a shawl, mementoes and bouquet. Kumar Sanjay felicitated Dr. Gaur with a shawl, mementoes and bouquet.

In his welcome address, Dr. Gaur presented the theme of the three-day conference and its outcome to the Honourable guests, dignitaries on the dais, participants and delegates. He thanked the Honourable guests for sparing their valuable time to grace the occasion. He requested Honourable Shri Rai to strengthen India's library and archives to achieve the goal of Viksit Bharat. He then requested the Rapporteur General to present the conference report to the Honourable guests and the house.

Shri Jha presented the report summary and read the recommendations adopted by the House for strengthening libraries and archives under the Central Government to contribute to the idea of Viksit Bharat. He requested the CGLA office bearers to upload the complete report of

approximately 50 pages to the association's website for reference to the delegates, participants and authorities. He thanked the CGLA for putting their confidence in him to take the prestigious role of Rapporteur General.

Dr. K.P. Singh addressed the house on the occasion. He thanked Shri Rai, Dr. Gaur, Dr. Joshi and the Conference Organizing Team for the Honour on the occasion. He said that without developing a library, the nation's conceptual development is impossible. Once we develop ourselves at the idea level, the nation will automatically get developed. For this purpose, we must provide access to our library to every citizen of the nation, whether they live in the village of Ladakh or the island of Andaman and Nicobar. He further said that he is always ready to put in his efforts and contribute to any given role in developing such a project. He thanked everyone in the house once again.

Shri Rai thanked Dr. K.P. Singh, Dr. Gaur, Dr. Joshi, and the conference organising team for this conference. He said that the organising team may prepare a concrete plan for a strong library system in our country, and he himself will take time from the Prime Minister to make the plan successful. He thanked everyone for the success of the conference.

In his conceding remarks, Dr. Joshi thanked Honourable Guests, participants from across the country and foreign countries, and the organising team for making this conference successful.

Shri Kumar Sanjay proposed the vote of thanks to the Chief Guest, Guest of Honour, chairperson of the Session, and the Conference Chairman. He thanked all the participants, delegates and experts from the country and outside of the country for their contribution and participation. Also thanked the researchers who presented their research papers at the conference. Further, he thanked the sponsors for their generous support of the conference. He especially thanked the IGNCA Management for providing all kinds of support and making this 5th International Conference of the CGLA successful. He thanked all the members of the advisory committee and sub-committees for their valuable suggestions and efforts for this conference.

The Chief Guest and the Guest of Honour presented mementoes to the organising committee members and Sub-Committees.

The Session was concluded with the National Anthem. Tea was followed.

Committees

Conference Organizing Committee

1. Conference Chairman	Prof. (Dr.) Ramesh Chandra Gaur Professor & Dean (Administration), Indira Gandhi National Centre for the Arts, Ministry of Culture, Government of India, New Delhi.
2. Conference Vice Chairman	<ol style="list-style-type: none"> 1. Shri Ramesh Kumar Goyal President, Central Government Library Association, Dehradun. 2. Shri Mukesh Kumar Library and Information Officer Election Commission of India, Government of India, New Delhi & President, Central Government Library Association, Delhi.
3. Organizing Secretary	<ol style="list-style-type: none"> 1. Sh. Kumar Sanjay Director (Library) NITI Aayog, Government of India, New Delhi 2. Dr. Ajit Kumar Director Central Secretariat library Ministry of Culture, Government of India, Shastri Bhawan, New Delhi
4. Joint Organizing Secretary	<ol style="list-style-type: none"> 1. Dr. O.N. Chaubey Sr. Vice President, Central Government Library Association, Delhi 2. Dr. E. Gajalakshmi Librarian, National School of Drama, Ministry of Culture, Government of India, New Delhi & Secretary, CGLA, Delhi
5. Asst. Organizing Secretary	<ol style="list-style-type: none"> 1. Dr. D.K. Pandey Library Officer, Indian Institute of Petroleum, Dehradun & General Secretary, Central Government Library Association, Dehradun 2. Dr. Vinod Kumar Librarian, Dayal Singh College, University of Delhi, New Delhi

6. Conference Treasurer	Shri Vikas Kumar Library and Information Officer Prime Minister Memorial Museum & Library, Ministry of Culture, Government of India, New Delhi & Treasurer, Central Government Library Association, Delhi
7. Liaison Officer	<ol style="list-style-type: none"> <li>1. Ms. Nutan Kumari Library and Information Officer Ministry of Corporate Affairs, Government of India, Shastri Bhawan, New Delhi & Executive Member, CGLA, Delhi <li>2. Dr. Pankaj Chaurasia Assistant Library and Information Officer Prime Minister Memorial Museum & Library, Ministry of Culture, Government of India, New Delhi & Executive Member, CGLA, Delhi <li>3. Shri Vinay Prabhakar Mishra Library and Information Assistant, Central Secretariat Library, Ministry of Culture, Government of India, Shastri Bhawan, New Delhi

MEMBERS OF THE ADVISORY COMMITTEE

1. Prof. Ajay Pratap Singh, Director General, National Library of India
2. Dr. A.K. Suman, LIO, IGNFA, Dehradun
3. Dr. Akash, Librarian, NCERT, Delhi
4. Dr. Anli Singh, Assistant Director (Library Services), Competition Commission of India.
5. Dr. Aurn Kumar Chakraborty, Head & Professor, NSOU, Kolkata
6. Dr. Azizur Rahman, Addl Librarian, KZIU, Bangladesh
7. Prof. Devika Madali, Director, INFLIBNET Centre, Gandhinagar
8. Dr. D.D. Lal, Librarian, National Brain Research Centre, Haryana
9. Dr. D.K. Singh, Librarian, BHU, UP
10. Dr. G. Mahesh, Head, NSL, NISCAIR, New Delhi
11. Sh. Harish Kumar, Senior Manager (Library), Airports Authority for India, New Delh
12. Dr. Heather Brown, Librarian, Sector Standards and Education, ALAI Australia

13. Dr. Jagdish Arora, Former Director, INFLIBNET
14. Dr. J.N. Singh, Librarian, Dayal Singh College (Eve), New Delhi
15. Dr. Jyotsna Arora, Deputy Director (Library), Indian Council for Historical Research, New Delhi.
16. Dr. K.P. Singh, LIO, IPC, Ghaziabad
17. Mr. K.N. Jha, Assistant Professor, DLSI, DSEU, New Delhi
18. Prof. K.P. Singh, Director, Gandhi Bhawan & Professor, DU, Delhi
19. Dr. M. Veeramani, Head, University Library, International University in Kuwait, Kuwait
20. Dr. Nabi Hasan, Librarian, IIT Delhi
21. Dr. P.K. Upadhyay, Former PTO, NCI, New Delhi
22. Dr. P.R. Goswami, Former Director, CSL, Ministry of Culture
23. Dr. Partha Sarathi Das, ALIO, National Library of India, Kolkata
24. Dr. Praveen Babbar, Deputy Librarian, JNU, New Delhi
25. Dr. Priya Rai, Deputy Librarian, National Law University, Dwarka, New Delhi
26. Prof. R.K. Bhatt, HOD, DLIS, Delhi University
27. Dr. R.K. Chadha, Additional Secretary (Retd.), Parliament Library, New Delhi
28. Smt. Shompa Das, Scientist F'' & Head of LIP Division, ITM Pune
29. Dr. Sanjeev Kumar, University Librarian, Dr. B.R. Ambedkar University, New Delhi
30. Dr. Sangeet Kaul, Director, DELNET, New Delhi
31. Dr. Shantanu Ganguly, Director (Library), Ashoka University, Sonapat, Haryana
32. Dr. Sivaprasad Senapathi, PLIO, National Library of India.
33. Dr. Sonam Singh, NIPFP, Delhi.
34. Dr. T. Pratheepan, Librarian, Uva Wellasa University, Sri Lanka
35. Ms. Uma Tyagi, Librarian, Valabhbhai Patel Chest Institute, New Delhi
36. Dr. Usha M. Munshi, Librarian, IIC, New Delhi.

SUB-COMMITTEES

1. Registration & Reception Committee
 - (i) Sh. Vikash - Coordinator
 - (ii) Sh. Rajkumar, NITI Aayog
 - (iii) Sh. Rahul Kumar Singh, PMML
 - (iii) Sh. Ram Karan Pal, NITI Aayog
2. Accommodation Committee
 - (i) Sh. Mukesh Kumar - Coordinator
 - (ii) Sh. Pankaj Bhati, National Museum
3. Liaison Officer
 - (i) Sh. Rakesh Kumar Pal, DARPG
 - (ii) Sh. Satya Prakash, M/o Labour
4. Stage Committee
 - (i) Dr. E. Gajalakshmi - Coordinator
 - (ii) Ms. Safia Kabir
 - (iii) Dr. Sapna Verma
 - (iv) Sh. Pankaj Chaurasia
 - (v) Sh. Gopal Singh
 - (vi) Ms. Yati Sharma
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 - (ii) Sh. Kumar Sanjay
 - (iii) Dr. Ajit Kumar
 - (iv) Sh. Mukesh Kumar
6. Hospitality and Food
 - (i) Dr. Vinod Kumar – Coordinator.
 - (ii) Sh. Subra Das
7. Transport Committee
 - (i) Sh. Amit Prakash Gupta - Coordinator
 - (ii) Sh. Rakesh Giri

8. Media Committee
 - (i) Sh. Sanjay Vats - Coordinator
 - (ii) Dr. E. Gajalakshmi
9. Web Publishing
 - (i) Sh. Mukesh Kumar – Coordinator
 - (ii) Ms. Shompa Das
10. Conference Kit
 - (i) Dr. Kumar Sanjay - Coordinator
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 - (iii) Sh. Vikash Kumar
 - (iv) Sh. Subra Dass
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 - (i) Dr. O.N. Chaubey – Coordinator
 - (ii) Ms. Nutan
 - (iii) Ms. Safia Kabir
12. Reporter General
 - (i) Sh. K.N. Jha – Coordinator
 - (ii) Sh. Avinash
 - (iii) Ms. Sompa Das
13. Award Committee
 - (i) Prof. (Dr.) R.C. Gaur – Coordinator
 - (ii) Sh. Kumar Sanjay
 - (iii) Dr. Ajit Kumar
 - (iv) Ms. Nutan Kumari

Sd/-
(Kripa Nand Jha)
Rapporteur General

2

Proposal of GILNET

A Proposal for Government of India Libraries and Information Network (Gilnet): One Government One Library System

Prof. Ramesh C. Gaur, Dean and Head IGNC, New Delhi

Kumar Sanjay, Director, NITI Aayog Library

Ajit Kumar, Director, Central Secretariat Library, M/o Culture

Sh. P.K. Upadhyay, Ex- Sr. Technical Director, NIC

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1. VISION & MISSION

Vision: One Government One Library System

Integration of all government libraries for optimum utilisation of information resources.

MISSION: Setting up an integrated Library Management System across Ministries/ Departments/ Autonomous Bodies under Union Government on Mission mode under the name of Government of India Libraries and Information Network (GILNET).

2. INTRODUCTION

Libraries in many countries, especially developed nations, have embarked on next-generation reforms. However, in India, we are continuing with an age-old system of functioning of Libraries, as a result of which their optimum utilisation is getting hampered. Therefore, it is imperative to introduce fundamental changes in the Libraries and Information Network at par with international standards and practice.

In India, we need to set up state-of-the-art cloud-computing platforms to keep pace and speed the rollout of the high-speed network (e.g. NKN))-enabled content from among libraries. Various ministries in the union government have an in-house library system. They are working in isolation. Isolated library systems not only provide limited services but are expensive as well. There is a duplicity of information resources, non-uniform cataloguing systems and software. Thorny problems like shrinking budgets, decreasing footfall in library premises, rising costs of books and periodicals, and not fulfilling the requirement of patrons in a digital age lead to exploring the possibility of creating an Integrated Government Library System that uses technology to network various Libraries housed in different union Government Ministries to provide better services.

Therefore, one networking system is essentially required to meet the challenges and fulfil the objectives of all government libraries. This network may be called “Government of India Libraries and Information Network (GILNET).

3. NEEDS AND PURPOSE OF GILNET

The primary purpose of the Government of India Library Network is to achieve optimum utilisation of the information resources. Advances

in Computer, information, and telecommunication technologies have revolutionised the way in which information is acquired, stored, accessed and transferred. Sharing and subscribing to electronic resources in a consortium way has rapidly become another important goal for libraries. Some more points are

- i. Digital disruption has changed what users can find in libraries
- ii. and what they need from libraries
- iii. Inadequate digital infrastructure in libraries has made them more expensive to administer and less responsive to their readers.
- iv. Almost all government libraries are hard to find online
- v. Limited digital collaboration among libraries and with publishers.
- vi. Publishers need reliable, scalable channels through which they can establish and extend their relationships with readers.
- vii. Insufficient investment on the part of libraries in their digital
- viii. services as compared to their physical part
- ix. Limited human resources

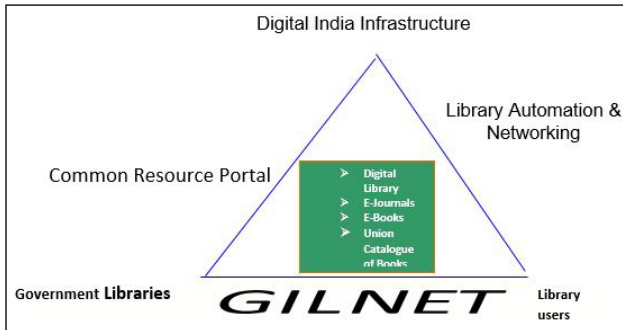


Fig. 1: Government Library Network Activities

4. SCOPE OF PROJECT (GILNET)

This Project is limited to ministries/departments/ autonomous bodies under the Union Government of India.

5. OBJECTIVES

The Objectives of the GILNET are as follows:

- i. Creation of Union Catalogue of all participating libraries

- ii. Creation of a Government Digital Library (GDL) of participating Knowledge Resources
- iii. Resource Sharing among participating Libraries in a consortium model
- iv. Resource Optimisation for Participating Libraries
- v. Transformation of traditional libraries to Digital Libraries
- vi. Managing cost efficiencies, interoperability, sharing best practices, and responsiveness to rapidly changing technology and needs.
- vii. Automation and Networking of participating libraries of all ministries/departments/ autonomous bodies of the Union of India
- viii. Capacity building of participating Library Professionals
- ix. Creation of a Common Card System for users of the participating libraries

6. PROGRAMMES AND ACTIVITIES UNDER GILNET

The Following activities are proposed under the GILNET Project

- i. Approval of GILNET Project and Project Plan.
- ii. Approval of Fund for GILNET Project.
- iii. NIC may be requested for a cloud Infrastructure facility for GILNET
- iv. Manpower Deployment for technology implementation
- v. Deployment of Open-Source Library Management Software (Koha and Dspace) on the cloud
- vi. Development and Deployment of crosswalk and APIs for cloud-enabled libraries and information centres
- vii. Creation of GILNET Portal (Single Window search portal).
- viii. Creation of Union catalogue through single database and multiple libraries.
- ix. Implementation of a Common Card System (CCS) for members of the participating libraries.

7. RECOMMENDED IMPLEMENTATION STRATEGY

Automation and Networking of Libraries and Union Catalogue of Government Libraries

Government Libraries (i.e. Libraries of various Ministries/Departments/ Autonomous Bodies) must be modernised and networked to provide

24x7 access to information. There are about 500 Government Libraries in India. However, it will be limited to Ministerial/Departmental Libraries/Autonomous bodies of the Union Government situated in Delhi in the 1st Phase. Automating the libraries and IT infrastructure like server machines, LAN connectivity, data security, disaster management, etc., requires huge investment, which is not feasible in isolation. There is a need to raise a national-level infrastructure to support these libraries at the NIC Platform and bring their content into the mainstream. Software as a Service and Infrastructure as a Service can be used to cut down the investment of libraries in their respective libraries. Open Source Software (OSS) is playing a significant role in this direction, and the Government of India realised this and announced a policy framework where Koha, DSpace and Drupal have been recommended for libraries https://www.meity.gov.in/sites/upload_files/dit/files/Framework_on_adoption_of_OSS.pdf

In libraries, collections of books and other documents are more or less similar. The NIC Platform can be used to avoid bibliographic data entry duplication and build a Union Catalogue for resource sharing among the libraries.

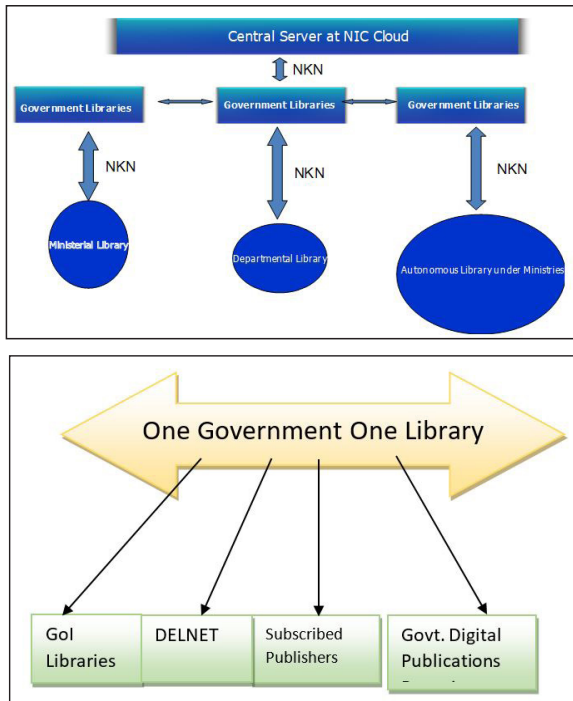


Fig. 2: Government Library Networking using NKN and NIC Infrastructure

7.2 Government of India Libraries: Single Window Search Portal

Libraries have a hybrid collection of printed documents/catalogues and resources, as well as OPACs, e-journals, eBooks, subject indexes, full-text databases, and their local digital libraries. The Government Libraries, namely NITI Aayog, CSL, Meity, Parliament, National Medical Library, National Science Library, NMML, IGNC, DST, etc., have a huge collection of rare documents, manuscripts, photographs, journals and other very important documents. Presently, the holdings of these libraries are being searched through a different search portal. Therefore, in view of catering better services to the reader, a single-window searching system must be created.

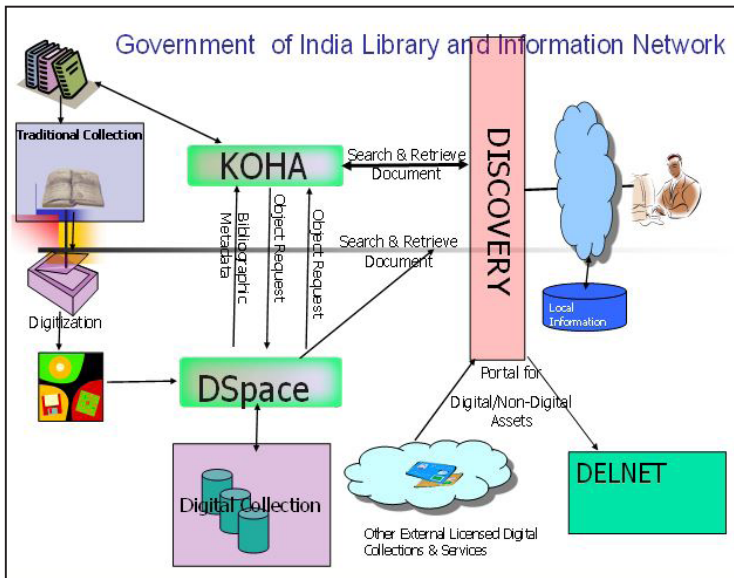


Fig. 3

This integrated online platform will extend the knowledge management capabilities to Library digital and print contents with appropriate metadata standards such as MARC, Dublin Core, etc.

7.3 Authentication System for Single Sign-on System for Participating Libraries

To provide single sign-on capabilities to participating libraries and allow library users to authenticate only once to access many e-resources.

Provide secure access to internal and external information resources (eBooks, e-Journals, Databases, Local DL, Catalog, Library Management, etc)

At present, libraries across India's government cannot take advantage of eResources and are not technically ready except for IP-based or userId/password-based authentication. To have round-the-clock 24x7 access off-campus, an authentication service is needed at the hour on lines similar to those of Athens and Shibboleth in the UK and USA. NIC is the most appropriate organisation to implement in cooperation with Libraries, Consortium and Publishers.

7.4 Common Card System for Members of Participating Libraries

The Government libraries are isolated in terms of resources and services. For example, in the present scenario, a member of one library cannot borrow books from another until they become a member. So, it is proposed that a common card system for members of participating libraries be introduced in view of smooth and easy access for the members of the participating libraries. Once it is implemented, the member of the one participating Library can borrow the books from other another participating Library. This service can not avail from the participating Reference Libraries, but the members of the participating Reference Libraries can avail of this facility from the other participating libraries.

7.5 Government Digital Library (GDL)

Archived resources, subscribed e-Resources and Local Digital Contents of Educational, Scientific, Social and Cultural Heritage.

7.5.1 Government Digital Trove

The Government of India has a huge collection of research publications, reports, books, rare documents, manuscripts, photographs, journals and other important documents. These are lying either in print form or partially digitised and available through various websites. All these rich knowledge trove digitised contents will be brought under one umbrella, GILNET, accessible to researchers, policymakers and ordinary citizens.

7.5.2 Digital Archiving of Subscribed/Purchased Contents

Government Libraries are subscribing to e-books, and e-journals are expected to keep the contents backed up/archived for the subscribed

period. They need to invest money to have a data centre, server machines, etc., to give their users access to the archive after the discontinuation of service. At the GILNET platform, a Digital Archive facility can be built to store licensed content.

7.5.3 Digital Archival of Indian Publications

As per the Delivery of Books Act of the Government of India, each copy of a print book published in India is to be deposited one copy out of four at the National Library of India located in Kolkata. Along similar lines, all the e-books and educational content published in India should be deposited in the digital repository designated by the government. Ministry of Culture may take a call in this regard, and this digital initiative of the Government of India Library Network (GILNET) platform may be used for the purpose.

7.6 Consortium of Government of India Libraries and Information Centres (CGILIC)

CGILIC represents and supports its members' interests in delivering information services to government organisations and extends benefits to citizens in India.

Looking into the trends of e-books and e-journal subscriptions and access time is apt for provisioning common requirements of Government libraries. By procuring common requirements at the GILNET platform, these e-books and e-resources may be utilised maximum, and duplicate procurement may be minimised by saving huge costs. Right now, government libraries subscribe to Journals/Magazines related to common government requirements in print form. The most beneficial properties of e-books and e-journals, like round-the-clock accessibility, retrieval of information at light speed and mouse click access, are the add-on features.

Some of the common e-Resources subscriptions of GILNET Consortium enlisted (not limited to) may be as below. Negotiations for License agreements at a high discount rate with publishers in India and abroad may be done on behalf of the Government Libraries Network (GILNET)

- i. Discovery Platform for integration of Library OPACs, Digital Libraries, and subscribed publishers' content.
- ii. Authentication Platform (EZProxy/Open Athens)
- iii. Anti-Plagiarism Tool (Turnitin)

- iv. Journals Metadata contents (J-gate)
- v. Proquest
- vi. Scopus/Web of Science
- vii. JSTOR
- viii. World Book Library
- ix. DELNET Database

7.7 Utilising the Power of Open Source Library Software in Participating Government Libraries

In the open-source library software arena, many innovations are taking place. The strong foundation working here is community-based development against the development of proprietary software by commercial companies. Libraries across the world are utilising this opportunity and valuing open-source options for less expensive software and flexibility that are often not delivered by proprietary products. Regardless of the software license and development model, the outcomes depend on how the software aligns with the needs of the organisations it is intended to serve.

The recent Open Source Software policy formulated by the Government of India will enable freedom of use and re-use of ICT assets along with the availability of strong OSS community support. In this policy, Koha, DSpace, and Drupal software have been recommended for library applications. Innovation in open-source systems has enabled libraries to extend their information management to digital libraries and integrate these resources with other resource management and discovery tools. Following combined open-source systems effectively may provide rich integrated library solutions in the country under the Digital India Programme.

Koral <http://coral-erm.org/> – CORAL is an electronic resources management system consisting of interoperable modules designed around the core components of managing electronic resources for libraries and other organizations. CORAL is available as a free, open-source program.

VuFind<http://vufind-org.github.io/vufind/>– a discovery tool that can harvest across multiple information sources. Using Apache SOLR, it would scale well to large search sets. VuFind is relatively new to the scene but provides an excellent search front-end and can harvest and import data from various sources.

Koha<http://koha-community.org/> – an effective Library Management System that can scale to several searches across several million objects and Federated search.

DSpace<http://dspace.org> – a scalable Digital Library System that can support very large collections.

8 ADMINISTRATIVE STRUCTURE OF THE MISSION FOR GILNET

The following shall be responsible for the administrative and financial approval of the strategy, planning and resources:

- i. Task Force Committee
- ii. Project Monitoring Committee (Project Approval Board)
- iii. Mission Directorate and Mission Director (Director)
 - Program Heads/Team Leaders (Deputy Director/ DS Level)
 - Associate Team Leader (US Level)
- iv. Finance Committee

8.1 Task Force Committee

Keeping this in view of the integration of the Government Libraries, a Task Force on “Integrating Libraries across Central Ministries/ Departments may be constituted with representation from other Ministries/ Departments/Organisations.

This body shall play a pivotal role in policymaking and provide overarching principles for the success of the Mission GILNET. The role of the Task Force Committee is to guide and mentor the activities of the Mission. This body can suggest high-impact ideas, formation of groups/ networks/ communities and outcome usages. The Task Force Committee may also like to facilitate international collaborations to fulfil the government’s technical aspirations for an enhanced Information Network.

8.2 Powers & Functions of Task Force Committee

- i. Overall policymaking, giving the direction for the Mission
- ii. Framing of guidelines and overview
- iii. Nomination of members & experts on the Project Approval Board

- iv. Strategy formulation & mid-course corrections
- v. Periodic review of outcomes and general monitoring of the Mission as a whole
- vi. Coordination between various Central Ministries and between centres, States, NGOs, etc.
- vii. Addition/alteration of powers and functions of any Committee or authority under this Mission
- viii. Decisions regarding delegation of power (Financial or otherwise) to various Committees/ Authorities/ functionaries involved in the Mission

8.3 Project Monitoring Committee (Project Approval Board)

It is also required to constitute a Project Monitoring Committee (PMC), a subcommittee of the Task Force.

The Project Monitoring Committee will be known as the **Project Approval Board**, which would have the power to sanction various projects based on the Detailed Project Reports (DPRs). The Board will also monitor the overall progress through various peer reviews and concurrent evaluations. The **Project Monitoring Committee (Project Approval Board)** will work under the supervision of the Task Force Committee. This office shall play an important role as an interface between the Task Force Committee and Mission Directorate.

8.4 Powers and Functions of Project Monitoring Committee [Project Approval Board]

- i. Critical appraisal and sanctioning of various project proposals under the mission are based on detailed studies.
- ii. Making recommendations to the Task Force Committee on matters of importance.
- iii. Final negotiations/deliberations on IPR/copyright-related issues.
- iv. Selection of domain experts for GILNET
- v. Promotion of any other activity that is of interest to the spirit of the Mission.
- vi. Management and funding
- vii. Network of experts/institutes/industry-institute/any network
- viii. useful for the Mission in various fields.

- ix. Deliberating on the powers and functions of the Mission Director
- x. The PAB will take the services of domain experts as and when required.
- xi. Review of milestones for project deliverables.
- xii. Dovetailing projects in the broad area of activity.
- xiii. Any other work assigned by the Apex Committee.

8.5 Finance Committee

The Finance Committee may be constituted to regulate the financial aspects of the Project. The Director will Chair this Committee and any two (2) Members from the Participating Libraries on a rotation basis for three years. They should be from the Finance Department of the Participating Libraries. One outside member is to be nominated by the Task Force Committee.

8.6 Mission Directorate

The Secretariat of GILNET will be started from the Central Secretariat Library, M/O Culture, a nodal agency for government Libraries, and will be shifted to another Government office, or a Separate Office may be created with the decision of the Empowered Committee. An outsourced agency (empanelled at NICSI) will be hired to support the initiative with funding from NITI Aayog over the first five years. Alternatively, in case of any difficulty, suitable persons may be recruited on a contract basis or hired on an outsourcing basis so that the work may not suffer and get delayed. The proposed name and website are given below:

Name: Government of India Library and Information Network (GILNET)

Website: <https://www.gilnet.nic.in> , <https://www.gilnet.gov.in>. **Email:** gilnet@gov.in

Discussion forum: https://lsmgr.nic.in/mailman/listinfo/gilnet_forum

The Directorate enables GILNET mission success. It will provide fundamental support to meet the needs of the mission. The Directorate will provide a skilled technical workforce, physical assets, and financial resources to meet the mission requirements. It will also provide innovative, high-quality solutions and leading-edge enterprise services to empower GILNET members and ensure GILNET leadership in the Indian Library System. The Mission Director will head the Mission Directorate.

8.6.1 Mission Director and its Team

The Mission Director will be the functional head of the Mission. The power and Functions of the Mission Director will be as follows:

- i. Review of progress and decision to release instalments of grants for specific projects based on approvals from PAB.
- ii. Project monitoring at regular intervals
- iii. Peer review meetings are held to monitor progress and dovetail with other projects in the same broad area of activity.
- iv. Assessing and approving the utilisation certificates submitted by
- v. Project Implementing Institutions
- vi. Supervision and review the performance of Team Leaders and all the functional units of the Mission
- vii. To take care of the work of Program Heads/Team Leaders, Associate Team and Field Units Leader (Associate Director) of each activity group
- viii. Coordination to ensure a smooth flow of resources
- ix. Enabling execution and integration of deliverables
- x. Flexible structuring of groups and subgroups
- xi. Identifying the feedback system and ensuring that feedback reaches the appropriate group/sub-group
- xii. Coordination among various Team Leaders
- xiii. Budgeting and preparation of DPRs with the help of team members
- xiv. Any other work assigned by PAB

8.6.2 The Project Manager

The Project Manager will lead each type of activity for the Mission. At least one member of these activity groups would be represented on the Core Management Team of the Mission Director. These activity groups would be located in institutions entrusted with the responsibility of completing the activity on time and with high quality. This structure has been created to ease the administrative and management structure to maintain the smooth flow of resources and achieve efficiency and effectiveness.

8.6.3 Associate (IT/Koha/Dspace/Library)

The Associate Team consists of Domain Area Coordinators, Project Assistants, Content Developers, Graphic Designers, Content Writers and

Content Editors, Video Editors, Metadata Creators, Analysts, Web and App Developers / OTT team, etc. The Office Assistant and Attendant will assist the Associates.

8.7 Administrative Structure of Mission for GILNET



Fig. 5: Structure of GILNET

9. PROJECT MANAGEMENT

9.1 Preparation of Projects

Proposals will be prepared/ invited/ received by the Mission Director. The proposal received from individuals or institutions will be first screened at the level of the Mission Director with the help of the Core Management Committee. The Mission Director will nominate suitable team leaders to be part of the Core Management Committee based on the project components and expertise of the team leaders. The Mission Director may co-opt some domain experts if so required to evaluate the projects and seek their suggestions.

9.2 Submission of Proposals

- i. Initial project proposals will be submitted to PAB for approval.

- ii. The proposal should contain the objective, justification and relevance, approach and methodology, a time-bound outcome-based action plan with a PERT chart, stage/phase-wise, the activity-wise and outcome-wise requirement of funds, project staff requirements, proposed networking with other institutions to attain synergy and avoid duplication, facilities required from other institutions, administrative structure and norms adopted for various sub- activities, social cost-benefit analysis of the proposal, list of experts who will be working on the Project, their bio-data etc., the current status of research in that area, etc.

9.3 Screening of Proposals

After consultation with the Mission Director, the PAB will screen the project proposals. PAB may co-opt domain experts if they deem fit for evaluation and suggestions. After incorporating suggestions, if any, the proposal will be approved and sent back to the Mission Director for implementation.

9.4 Reports & Returns

All progress reports (Quarterly / Half-yearly/ Yearly) shall be submitted to the Apex Committee for perusal. The reports will also be uploaded electronically and shall be made available on the Mission website so that progress project outcomes are known to the project monitoring and the supervisory Committee.

Once a year, the whole team of people involved in the Mission should meet to exchange thoughts and add value to the Project. Reports of such workshops can also be uploaded on the website.

9.5 Evaluation of Projects under this Mission

- The Mission Director may deem it fit to get reports evaluated by outside experts.
- Such evaluation may occur twice during the project period, once for mid-term correction and another after final submission.
- Project evaluation criteria shall be developed by a group of experts so that all project outcomes can be quantified. Even negative results would be encouraged for documentation so that repetition of some exercises can be avoided in the future.

10. FUNDING

Initial funding for five years will help to establish the NETWORK. The cost can be roughly divided into documentation, research, subscription/purchase of eResources, **hiring agencies, human resources, cloud infrastructure and equipment** (computers, hardware, software, etc).

Components of the cost may be spread over the following activities:

- Library Automation
- Repository of Government digital documents
- Training and workshops
- Single Web Portal integrating all Government libraries
- Subscription and procurement of e-books and e-resources
- Integration with DELNET for Presence Across Nation (PAN) India Library search and Document Delivery Service from among libraries
- Ground/field surveys
- Documentation and data editing, validation and verification
- The hiring of professionals at various levels,
- Management and Infrastructure
- Upgradation and maintenance
- Software Development or purchase of software/ hardware
- Upkeep and up-gradation of Mobile app
- Awareness campaign and visibility event
- Workshops, seminars, conferences
- Capacity building and training workshops
- Digitisation of data, its uploading
- Newsletter, yearly documentation and other publicity materials

10.1 Resources and Budget Requirement

Table 1: Cost Estimate

S. No.	Item	Rate (Rs.)	Quantity	Multi- plication Factor	Total Annual Cost (Rs.)	Total Cost for 5 Years (Rs.)
	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E=DxB</i>	<i>F=Ex5</i>
Common Manpower Requirement for GILNET	Project Director: The member Secretary of the Governing Board of GILNET will be Project Director					
	Project Manager	80000 -100000 (5% Increment every year)	1	12 Months	9,60,000	55,00,000 (With other Allowance)
	Associate (IT/Koha)	60000-80000 (5% Increment every year)	2	12	14,40,000	80,00,000 (With other Allowance)
	Associate (IT/ DSpace)	60000-80000 (5% Increment every year)	2	12	14,40,000	80,00,000 (With other Allowance)
	Associate (Library)	60000-80000 (5% Increment every year)	2	12	14,40,000	80,00,000 (With other Allowance)
	Office Assistant	30000-40000 (5% Increment every year)	2	12	8,00,000	45,00,000 (With other Allowance)
	Office Attendant	20000-30000 (5% Increment every year)	1	12	2,50,000	13,00,000 (With other Allowance)
Digital Space for Koha, DSpace and GILNET Portal	NIC Cloud	Miety Budget			--	--

(Table 1 Contd....)

(...Contd. Table 1)

e-Resources Sub- scription	E-Books, Online Newspapers and E-Jour- nals for Government Libraries				2,00,00,000	10,00,00,000	
Hardware Computers	Desktop	60,000	8		4,80,000	4,80,000 (one time cost for 5 years)	
	Laptop	80,000	5		4,00,000	4,00,000 (one time cost for 5years)	
	MFP/ Printer	20,000	2		40,000	40,000 (one time cost for 5years)	
Training/ Workshops	Travel/Stay for Work- shop (for 2 persons each workshop)	25,000		6 Work- shops	1,50,000	7,50,000	
SSL for website		1,00,000			1,00,000	2,00,000	
Site Auditing Service		1,00,000			1,00,000	2,00,000	
Office Mainte- nance Cost	Travelling, Meeting, Refreshment, Payment for Honorarium				5,00,000	25,00,000	
	Servers, Desk- tops, OS, Application Software, Network Connection	NIC Data Centres, NKN and Cloud Infrastructure to be utilised					
				Total	2,80,60,000	14,50,00,000 (With other Allowance)	

10.2 Minimum Qualification and Experience for Manpower

- i. Project Manager-B.Tech (CS/ ECS) with seven years of work experience in the same field.
- ii. Associate (IT/Koha)-B.Tech (CS/ ECS) with five years of work experience in the same field.
- iii. Associate (IT/Dspace)-B.Tech (CS/ ECS) with five years of work experience in the same field.
- iv. Associate (Library)-Postgraduation with Masters in Library & Information Science with five years of work experience in the same field.
- v. Office Assistant- Graduate/ OR B. Lib. Sc.
- vi. Office Attendant- XIIth

10.3 Budget Utilisation Guidelines

- i. The fund will be released immediately after the sanction for the Project is issued after obtaining the prescribed approvals. However, the broad principle would be to release up to 30% of the project cost as 'mobilisation advance' and link the release of remaining instalments to the deliverables.
- ii. Funds should be given in a non-lapsable manner for the first year (because of delays in getting the scheme sanctioned) but with a rigid time frame for completion. There should be separate earmarking of funds for convening meetings of experts and covering administrative expenses.
- iii. Funds would be provided to institutions and individuals. The institutions of repute could be in the private sector, too.
- iv. As far as possible, the norms would be evolved and dynamically updated to ensure uniformity of funding to various project agencies for similar types of activities. Experts may be Co-opted by the Mission Director as and when necessary. Honorarium, etc., received by any expert under any project of this Mission would be in addition to their salary from their organisation.
- v. These norms would be suitably determined, on the advice of the expert committees of domain experts, by the Empowered Committee of Experts (to be known as the Project Approval Board).
- vi. Estimated budget requirement of the **five-year Mission**
- vii. Year-wise estimated budget requirement of the Mission would be as follows:

Table 2: Estimated Budget Requirement

Sl. No	Financial Year	Approximate Amount Per Year (in Crores)
1.	2022-2023	Rs. 2.81
2.	2023-2024	Rs. 2.85
3.	2024-2025	Rs. 2.90
4.	2025-2026	Rs. 2.91
5.	2026-2027	Rs. 2.92
Total		Rs. 14.30

11. ROLE AND RESPONSIBILITIES

11.1 Membership of GILNET

The GILNET membership will be open to all Government of India Libraries with the approval of the Project Monitoring Committee and through a registration/MoU process.

11.2 Role and Responsibilities of Participating Libraries

- i. Create records using international standards as they will be adopted by GILNET. GILNET is recommending the creation of records using MARC, AACR II, the Library of Congress Subject Headings List and specialised thesauri, but libraries that have used other standards can still join GILNET and upgrade their records in due course of time).
- ii. Contribute the records of all items created by the Institutional Member to the Central Union Catalogues, Union Lists, etc. will be maintained by GILNET. The copyright of records created by the Institutional Member in its own machine will rest in the Institutional Member, but the copyright of the Central Union Catalogues shall rest in GILNET.
- iii. **The Institutional Member shall not** use the GILNET Union Catalogues, Union Lists and other databases for any commercial purpose. The Institutional Member shall not rent, sell or license the use of or deliver or release or otherwise part with the possession of the systems/materials/software or the GILNETT Union Catalogues, Union Lists and databases or any part thereof to any third person.
- iv. **The Institutional Member shall not** allow the use of the software/materials/database by any person other than its own bonafide members of its Library or information centre at the above location.

- v. For the Union Repository through Dspace software, the participating Libraries will provide the e-material with Dublin core metadata in an Excel sheet.

11.3 Availability of GILNET Portal and Services for Government Employees and General Public

The methodology is given in the following steps:

- i. Request for Digital Space to NIC
- ii. Installation of Koha (for Library database) and Dspace (for Institutional repository) on the cloud.
- iii. Audit both software to make it public.
- iv. The Project Manager of GILNET will take the data from the nodal
- v. officer of the participating Library.
- vi. The team GILNET will upload the data to the central cloud server.

12. FUTURE PLAN

12.1 Self Sustainability

- For Self-sustainability fund is required. So, different steps will be executed for fundraising.
- Nominal members' charges/fees for institutional membership are registration charges/ fees.
- Automation of Government Libraries on Payment Basis.
- Conduct a Training Programme for Library Professionals at nominal charges.
- Charges for Document Delivery Services.
- Nominal charges for accessing GILNET's digital resources.
- Document Delivery Services will also be extended to individual readers on a payment basis.

13. STRENGTHS AND CHALLENGES AHEAD

13.1 Strength

All information about books, reports, and other material from participating Government Library will be available on a common platform. This will, in effect, create a Common Catalogue across Ministries. Thus, despite physical distances, all information resources contained within Libraries will be available at a single digital location and in a common

format. All documents that are not copyright-protected will be digitised and made available to users through an online platform. The operational aspect of a Common Catalogue System will require developing/improving appropriate User Processes with adequate safeguards. Conceptually, all members of participating libraries are able to browse through aggregated library content across all Ministries and order them online for use.

13.2 Challenges

The bigger challenge with the current system is that Libraries housed in different ministries are like unconnected islands of knowledge. Staff in one Ministry cannot access the Library in another Ministry. Suppose a staff member at the Ministry of External Affairs wants to access the Library at Ministry of Social Justice. In that case, one cannot do so- (a) because the respective library catalogues cannot be accessed online, and

(b) the individual doesn't have permission to access books in another Ministry. In a lot of cases, when a request for a book is made, and it isn't available, the Library either requests other libraries for inter-library loans or ends up purchasing a new book. Often, a Library buys new books just because it has either no information on the books that other Ministry Libraries have or there are no mechanisms for loaning such books even if they are available. This is true for many important reports as well. Staff members in one Ministry are sometimes unaware of many unclassified reports in other Libraries and spend a lot of time on their research when the information they are looking for is easily available in other Ministry archives. These duplications and inefficiencies are not restricted to books alone. Many software packs that can be purchased for bulk users at a lower price are bought separately by Ministry Libraries, and thus, it won't be wrong to speculate that the overall cost to the government is significantly more than it should be. These processes lead to a lot of resource wastage in terms of time and money.

As part of the above-said Challenges, one of the more important challenges is the non-adoptability of any new initiative by the LIS professionals. In this regard, it is the responsibility of the GILNET to motivate them to adopt a new initiative, which is a requirement for new-age libraries.

14. PROJECTED OUTCOMES

The following are the projected outcomes of the proposed Mission for GILNET-Integrating libraries, which will not only improve efficiency but

also provide enormous value addition to users. It will be based on three guiding principles:

- (a) Minimising resource duplication, optimizing resources and improving cost efficiency
- (b) Easy online access to current library books, software, and reports through a common catalogue system, along with value-added services for all Union Government employees.
- (c) Improved data and information security.

In such a system, users will be able to browse through and order all books, reports, and content through a single platform. This will allow many more users to access pooled content across Ministry Libraries. Moreover, it will allow for minimising the many duplicate books and subscriptions.

Such a system will provide enhanced data security and increased access to digitised content. Ideally, the Unified Library System will run on Open Source Library Software, which will minimise its execution costs.

The key components of a Unified Library System will include a Common Catalog System, adequate IT infrastructure for seamless user experience and 24x7 access to e-resources.

15. EXTENSION OF THE PROJECT

Due to unforeseen circumstances or due to enhancement of the scope of activity in light of new experiences gained or research results obtained, it would be possible for the Empowered Committee to extend the term of the GILNET project beyond the scheduled timeline. This would, however, be done only under exceptional circumstances.

15.1 CALENDAR OF EVENTS

The Project Approval Board shall approve the calendar of events. The calendar would clearly indicate the start and end dates and the deliverable(s). The major milestones achieved will be mentioned, along with the project's name and the institute's. Details of deliverables have also been mentioned in different sections of this mission document.

Project/ Mission conceptualization:

Project Start:

Project Review: Project End Date:

3

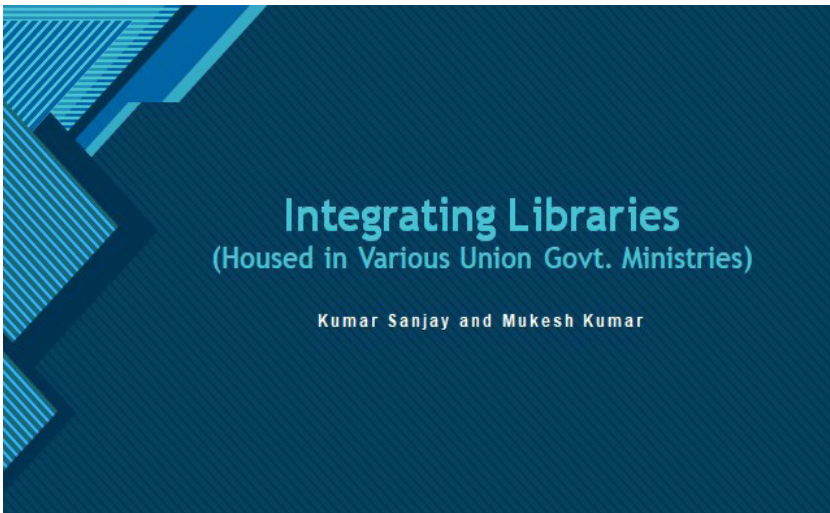
**PowerPoint Presentation on the
Integration of Libraries housed in
various Ministries under
the Union Government**

**PowerPoint Presentation on the Integration of Libraries housed in
various Ministries under the Union Government**

by

Kumar Sanjay

Mukesh Kumar



Introduction

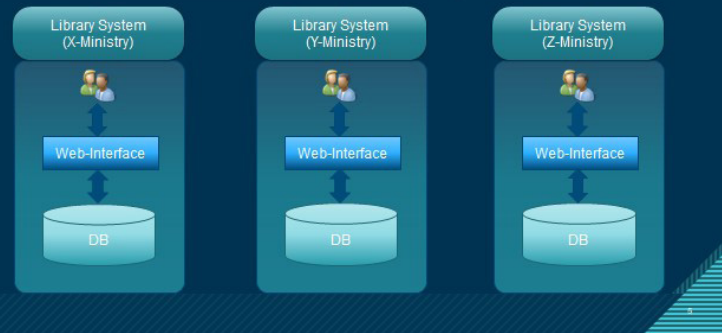
Library Systems in Union Ministries



- Each individual Ministry has its own in-house Library System
- Own localized DB-repository hosted in its own data center
- Houses important reports, papers & Books produced and used by Ministry staffs
- Discovery of resources restricted to smaller group in the Ministry
- Content, technology & their outreach limited to small group of people internal to Ministry
- Individual Library has its own catalogue system and own data format

Existing Library Systems in Union Ministries

Architecture: Existing Library Systems in Union Ministries



Limitations: Existing Isolated Library Systems in Ministries



- Each library systems are isolated from other library systems in union ministries
- Non-uniform catalogue systems
- Inefficient way of discovery of resources leads to rework & reproduction of content/report
- Inefficient & ineffective way of sharing resources (e.g. sharing important reports, papers, loaning a book)
- Leads to duplicity of library resources
- Individual data-center setup & duplicity in resource procurement increases overall cost to Govt
- Access & outreach restricted to smaller group

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Driving Factors: Integrate Libraries in Union Ministries



- Minimize duplicity of resources
- Reduce infrastructure cost
- Reduce resource procurement cost (through Consortia method)
- Online access to uniform catalogue of resources to everyone
- Make required resources available & reduce rework for research scholar
- Faster and timely access of resources
- Make resources available anybody, anywhere & anytime (24 X 7) through Web & Mobile app
- Collaboration needs among ministries

8

Integrate Libraries in Union Ministries

Integrating Libraries through Common Catalogue

- Migrating all information about resources on a common platform
- Create common uniform catalogue across ministries
- Despite scattered at physical locations, library resources will be accessible at one digital location
- Non-copyright resources can be available online for anyone, accessing it from anywhere at anytime
- Common catalogue system will require developing appropriate user processes and adequate safeguards

IT-Infrastructure

- A robust IT infrastructure supported by common data-center
- Allows seamless user experience
- Ensure data protection through blanket security firewalls
- User Authentication system deployed in cooperation with Libraries, Consortium & Publishers
- Help in running online learning & development courses across ministries

Software & e-Resource Subscription & New Value-Added service

- Bring in great cost efficiency
- Bulk purchase of resources reduces cost
- Setup common data center at NIC cloud
- Minimize IT infrastructure cost
- Archive subscribed material at a common place
- Minimize data loss & protect data leakages
- Unified Library System using open source software is cost effective

9

Integrate Libraries in Union Ministries



PMO Identified the need to integrate library systems in Union Ministries & suggested NITI Aayog to take necessary step to revamp them to

- Minimize resource duplication
- Online discovery of resources through uniform catalogue
- Collaborate & share content & technology among Union ministries
- Reduce overall cost by setting up common data-center (preferably on cloud), bulk procurement of resources, minimize duplicity of resources
- Increases efficiency of researchers through making important reports & content available to them and prevent them from reinventing the wheel
- Provide access to resources & increase their outreach to broader group through Omni channels (Web-app & mobile-app) support
- Improved data & information security

10

Proposition to Integrate Libraries in Union Ministries




- Design a common & uniform catalogue of resources across ministries
- Make discovery tool accessible online i.e. anyone, anywhere & anytime (24 X 7)
- Setup a common central data-center for library resources hosted on NIC Cloud
- Migrate existing individual DB records to central data-center hosted on NIC cloud
- Build common web-app and mobile-app for library management system using open source software (Dspace, Drupal, KOHA)
- Enforce security & restrict access of confidential resources
- Provide remote access to repository for group of user

12

Architecture: Proposed Integrated Library Systems in Union Ministries



Outcome: Unified Library System for Union Ministries

- 
- Fast track inter ministerial collaboration
 - Huge efficiency gain in terms of time & money
 - Minimize resource duplication & rework effort
 - Easy online access to current Library books, software, reports through a Common catalog System
 - Adequate IT infrastructure for seamless user experience
 - Non copyright resources available online to anyone, anywhere at anytime
 - Improved data and information security
 - Enormous value addition to user

Request for suggestions

library@viksitbharat.gov.in The End

Part B



4

A New Approach to Circulation, Tracking, Inventorying, and Security of Library Materials using RFID Technologies

Jawed Akhtar¹ and Dr. Shesh Mishra²

Abstract

In a developing nation like India, using Radio Frequency Identification technology in libraries has resulted in notable advancements in services like automated material handling, high-speed inventory, shelf charging and retrieving, and security. Beyond only keeping things safe, it has developed tracking systems that update records, lower data input mistakes, improve customer service, and track materials more effectively throughout the library. This article examines the potential of these components after adopting RFID technology and the reasons for the technology's delayed adoption, as suggested by documented literature covering pertinent Indian libraries. This study will assist librarians and other library professionals in demonstrating the library's long-term stability and increased return on investment.

Keywords: RFID Technology, Library Security, Information Extraction, Libraries, India

1 INTRODUCTION

“Radio Frequency Identification (RFID) technology has advanced significantly regarding the range of possible applications and their functionality.” RFID is used in many fields, including inventory control, road and rail rolling, aviation security, logistics, and developing nations

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like India. However, this technology's potential application and use in libraries is still in its early stages. (Hasan, 2012). According to the fifth law of library science, "a library is a growing organism," "librarians should always be interested in implementing the newest technologies to provide their customers with better and more efficient services." RFID technology has changed various library-related services and made everyone's job easier and more efficient, from patrons to library professionals, compared to traditional technologies like barcodes (Warrier, Kotian, Warrier, & Venna, 2016). However, "in a developing nation like India, the high cost of implementation and maintenance remains the main obstacle to the widespread use of such promising technology."

Thanks to RFID, Radio waves can be used to track and connect with an object, like a library book. This technology works on a similar principle to a cell phone. "RFID refers to a broad category of technologies automatically identifying persons or objects using radio waves." While there are other ways to identify anything, the most popular approach involves storing the unique serial number of a person or an object, along with perhaps additional data, on a microchip fastened to an antenna; this combination is known as an RFID transponder or an RFID tag.

The chip's antenna enables it to communicate unique data to a reader. The RFID tag's radio waves are reflected, and the reader transforms them into digital data that computers can use. (Thakre & Khatarkar, 2016).

2. REVIEW OF LITERATURE

Numerous papers about different aspects of paper reviews connected to RFID technology use in Indian libraries are currently available. This study's focus is restricted to articles written by Indian authors published in Indian and foreign journals between 2018 and 2024 and pieces about Indian libraries. The current review centres on the extensive studies released in India, considering the groundbreaking findings arising from the collaboration between RFID technology and Indian libraries.

Kumar & Kaur examined an RFID library system's benefits, drawbacks, parts, and technical aspects to recommend comparing various systems. They also provided an overview of the RFID system's estimated implementation costs, its operation, and the function of librarians (Kumar & Kaur, 2018).

Pandey & Mahajan focused on using RFID technology in libraries and expressed the opinion that, in addition to being a relatively new

technology, it is also becoming more efficient, practical, and affordable for securing libraries. It can replace the conventional electromagnetic security strip as a security measure. The authors discovered that the RFID tag does not need to be positioned in a certain way for an RFID reader to read it; instead, it carries all the necessary identifying information (Pandey & Mahajan, 2020).

Nagalakshmi described the use of RFID technology in libraries, its problems, and recommended practices. Since most Indian institutions have started applying RFID to monitor library resources, the author believes that the implementation of RFID in libraries should occur after reviewing privacy policies to protect issues and advantages linked to the patrons and standards of the institution (Nagalakshmi, 2019).

Mamdapur & Rajgoli covered in full the potential pros and downsides of the RFID system and the numerous uses of RFID technology. The authors expressed optimism that shortly, associated accessories and components, such as tags, will become less expensive as technology advances and related sectors compete (Mamdapur & Rajgoli, 2021).

Patel provided a clear image of how RFID technology is being used in libraries to improve self-check-in, check-out, monitoring, shelf charging and discharging, dependability, quick inventory, and automatic material management. To provide other academic libraries considering installing RFID systems with detailed information, the author also described the difficulties and potential solutions experienced during the implementation process (Patel, 2021).

3. RFID FOR LIBRARIES

RFID is utilised in library circulation systems and theft detection systems. By combining security with more efficient material tracking throughout the library, RFID-based systems go beyond security to become tracking systems that make material handling, inventorying, and charging faster and easier.

Librarians can save time on staff by utilising this technology to scan barcodes while items are being charged or emptied. Radiofrequency technology and microprocessor technology are combined in RFID. Regardless of the orientation or alignment of the goods, radiofrequency technology reads the data from microchips in tags affixed to library materials. The library exit(s) RFID gates can be as comprehensive as four

feet since the two parallel exit gate sensors can read the tags up to two feet away (Addepalli & Addepalli, 2014).

3.1 Components of an RFID System

A comprehensive RFID system has four components:

1. RFID tags that are electronically programmed with unique information
2. Readers or sensors to query the tags
3. Antenna
4. Server on which the software interfaces with the integrated library software is loaded.

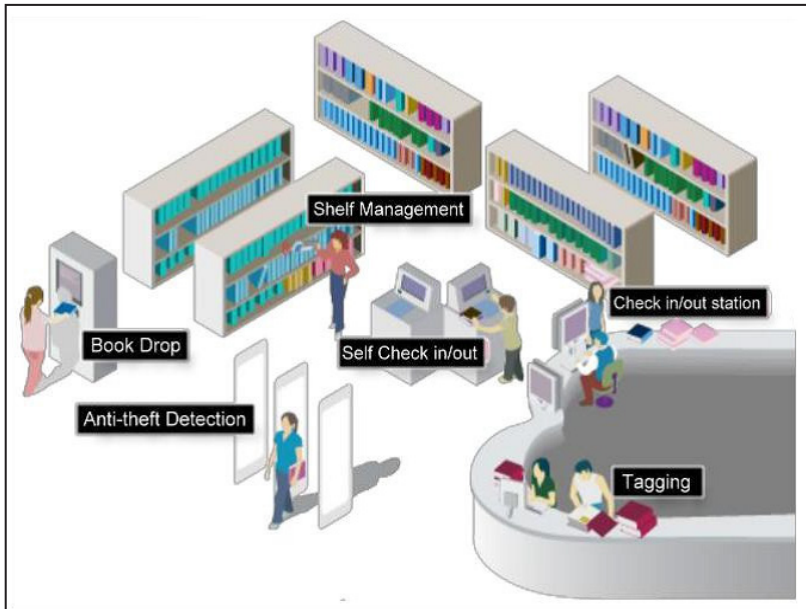


Fig. 1: RFID Library Management System

3.1.1 RFID Tags

“The RFID tag, which may be affixed directly to CDs, movies, or the back cover of books, is the system’s main component. This tag has two features: a programmable chip and an antenna. Each paper-thin tag has an engraved antenna and a microchip with a minimum 64-bit capacity.” There are three types of tags: “WORM,” “read-only,” and “read/write.” The tag is deemed “read-only” if the identity is encoded at the point of production and cannot

be changed. The utilising organisation programs the “WORM” (Write-Once-Read-Many) tags; however, they cannot be altered subsequently. Most libraries choose “read/write tags,” which allow for adding or modifying material. RFID-enabled libraries frequently have portions of their read/write tags—such as the item’s identification number—secured against rewriting (Singh & Mahajan, 2014).

3.1.2 RFID Readers

Radiofrequency (RF) communication is used to interrogate electronic tags, and RFID readers or receivers comprise an antenna, a control unit, and a radio frequency module. An RF field is created when the reader powers an antenna. “The reader decodes the data on the chip and transmits it to the server when a tag crosses the field. The RFID interface on the server then establishes a connection with the integrated library system.”

There are two types of RFID exit gate sensors (readers) at exits. One reads the information from the tag or tags going by and transmits it to a server. If the material is not correctly checked out, the server sounds an alarm after checking the circulation database. Another variation uses a “theft” byte in the tag that may be turned on or off to signal whether the item has been charged. Thus, it doesn’t need to communicate with the circulation database.

In RFID libraries, readers are employed in the following ways:

1. The conversion station is where library data is written on the tag.
2. Workstation for staff at circulation: utilised for charging and unloading library resources.
3. Self-check-out stations allow patrons to check out library resources independently without personnel’s help.
4. Self-check-in stations allow users to check library materials independently without personnel’s help.
5. Exit sensors confirm that every item taken from the library has been checked out.
6. Book-drop readers automatically release library books and turn on security again.
7. Conveyor and sorter: an automated mechanism to return materials to the appropriate library location.
8. A hand-held reader manages inventory and confirms that materials are correctly stored.

3.1.3 RFID Antenna

The antenna generates radio signals to read and write data to activate the tag. Antennas are the conduits that enable communication and data collection between the tag and the reader, which controls the system. An antenna may constantly produce an electromagnetic field when several tags are expected frequently. To collect tag data from people's belongings going through the door, antennas can be installed into doorframes (Sevukan & Vijayakumar, 2015).

3.1.4 Server

A server is at the centre of some large-scale RFID systems. It acts as a conduit for information exchange among the various components. "Data is transferred to the circulation database after information is obtained from one or more readers. Although no library vendor has yet fully implemented NCIP authorised by NISO, its software offers the SIP/SIP2 (Session Initiation Protocol), APIs (Applications Programming Interface), NCIP (National Circulation Interchange Protocol), or SLNP necessary to interface it with the integrated library software." Reports are often generated by a transaction database that is installed on the server.

4. KEY FEATURES OF RFID IN LIBRARIES

When selecting an RFID system, factors like dependability, simplicity of use, and the ability to easily tag a wide range of media types are crucial. Today's libraries are implementing RFID primarily to cut costs and boost efficiency. Libraries of all sizes can benefit from automation and self-service in achieving these goals, and RFID has the extra benefit of securing the variety of media that libraries offer. Additionally, the technology can enhance inventory control and circulation, which aids in distributing financial and human resources. This implies that professional staff members at libraries can be freed up from handling daily responsibilities and operations.

RFID technology for libraries uses only "passive" tags. Rather than a battery inside the tag, the reader or exit sensor provides the power to read the tags. Instead of just putting an RFID tag on staff and user identity cards, some libraries utilise "smart" cards, which are RFID cards with further encryption. This identifies users for the loan and return of library materials and access to restricted services or places. This would allow

it to be turned into a “debit” card, where value would be added when a user paid the library in advance and deducted when they used a printer, photocopier, or other fee-based device or wanted to pay fines or penalties (Sahoo & Sharma, 2015).

4.1 Self-charging/ Discharging

The use of RFID reduces the amount of time required to finish circulation chores. Librarians can save a lot of staff time by using this technology instead of having to scan barcodes when checking out and returning borrowed goods. RFID helps users’ lending and return processes run more smoothly. Employees in libraries have more time to work on exciting and worthwhile projects. When book drops have readers attached, staff members are even more relieved.

4.2 Reliability

The readers may be trusted implicitly. Several RFID library system suppliers claim RFID tag detection rates of nearly 100%. Specific RFID systems provide an interface connecting the exit sensors with the circulation software to detect the items leaving the library. If someone were to steal something from the library and get away with it, at least the library would be aware of it. The library can also identify who took the items without adequately billing them if the user card has an RFID tag.

Alternative RFID technologies encode the RFID tag’s circulation state. “To accomplish this, designate a bit as the “theft” bit and turn it on when it needs to be discharged and off when it needs to be charged. An instant alert is set off if the improperly charged material is carried beyond the exit gate sensors.” Using online access to an integrated library system and the “theft” feature together can also be a possibility. The online interface can detect what has been taken out and trigger an immediate alarm.

4.3 High-Speed Electronic Inventorying and Item Searching

The ability of RFID systems to scan books on shelves without knocking them down or removing them is a unique benefit. “With a hand-held inventory reader, you can quickly scan every unique identification piece on a bookshelf. Not only can the inventory be updated with wireless technology, but it may also be used to find things that are out of order.”

4.4 Automated Materials Handling

The automatic management of items is another benefit of RFID technology. “Conveyor and sorting systems that can transfer library materials and sort them into different bins or onto different carts based on categories are included in this. As a result, less staff time is needed to prepare the materials for reshelving.”

4.5 Tag Life

Since line-of-sight is unnecessary for the technology to function, RFID tags outlast barcodes. Most RFID suppliers guarantee at least 100,000 transactions before a tag might need to be changed.

5. CONCLUSION

It is well known that librarians are among the justifications provided to demonstrate how an RFID system could be a comprehensive response to a library’s item tracking and security needs. Library RFID doesn’t present a threat if best practices are followed adequately. It speeds up inventory management and book borrowing while freeing staff time for more user-service-related duties. Apart from cost savings, the technology was the first to adopt new technologies, and they have begun utilising RFID to secure library holdings and offer more effective and efficient circulation services. Even though RFID use in libraries has increased significantly over the past few years, the main obstacles to additional libraries adopting RFID technology are its cost, the lack of standards, and user privacy. Regarding the financial constraints, the technology can be achieved in terms of “Return on Investments” after the libraries implement it. It will expedite the circulation process and free up staff members to provide other services focused on users’ needs. In response to the lack of standards, libraries wishing to employ RFID must use tags that comply with ISO 28560 in addition to ISO 15693, ISO 18000-3, and other international standards and protocols provided by NISO. To safeguard user privacy, libraries must adhere to established protocols and refrain from storing personal data on RFID tags. Whether or not libraries use RFID technology today, they cannot prevent it because book distributors now offer books that have already been tagged at no additional cost.

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5

Accessibility and Technical Efficiency of Web-OPACs in South-Asian National Libraries: An Evaluative Study

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Abstract

Web OPACs are critical in bridging societal divides by offering equitable access to library resources. This study examines the technical performance and feature availability of Web OPACs across five out of 8 South Asian National libraries—India, Sri Lanka, Bhutan, Bangladesh, and Nepal—excluding three due to Web OPAC inaccessibility during data collection. The Web OPACs were evaluated for accessibility and inclusivity features, with performance metrics analyzed using Google PageSpeed Insights. Hypothesis testing was conducted using SPSS software, objectively comparing the Libraries' Web OPACs. The findings reveal that all libraries offer basic Web OPAC features, with India excelling in advanced search options and OpenURL compliance features. Bangladesh and Nepal provide extensive multilingual support in 78 languages, serving diverse user needs effectively. Bhutan outperforms others in overall performance, particularly in First Contentful Paint (FCP), Speed Index, Largest Contentful Paint (LCP), and load time, demonstrating an efficient, user-friendly experience. However, India may improve in mobile contexts, especially in FCP, Speed Index, and LCP. Significant differences in technical performance across devices were found, leading to the rejection of the null hypothesis for Speed Index, FCP, and LCP. However, there was no significant difference in Overall Performance, Total Blocking Time (TBT), Cumulative Layout Shift (CLS), Page Size, and Load Time. Implementing

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screen reader compatibility, adjustable text sizes, and expanding multilingual support enhances inclusivity and accessibility. Further, optimizing mobile performance, integrating external data sources, and OpenURL compliance ensure a seamless and user-friendly experience.

Keywords: Web OPAC, Accessibility, Inclusivity, South Asian National Library, Technical Performance.

1. INTRODUCTION

Web OPACs (Online Public Access Catalogs) are an integral part of modern libraries since they offer access to a wealth of stored bibliographic information. Effective OPACs play a key role in providing users with an efficient means to search, retrieve, and interact with vast bibliographic databases (Zumer & Zeng, 1995). In many parts of the world, including South Asia, challenges such as socio-economic disparities, language and cultural barriers, and variability in the levels of technology prevent equitable access to library resources. As public institutions, national libraries can offer “inclusive and user-friendly” OPAC systems that will provide users from various backgrounds, including people with disabilities and socially backward people, the chance of equitable access.

Inefficiency in performance and accessibility of an OPAC system directly affects its performance. Therefore, Libraries must address various factors to ensure that OPACs bridge various existing divides, enhance accessibility, and remain relevant in the digital age. These factors include “multilingual support, compatibility with technologies, mobile optimization, and user-friendly interfaces” that facilitate easy access. While most libraries have integrated Web OPAC systems, they vary in technical efficiency, and users’ understanding of them affects the user experience (Kalin, 1991).

This study evaluates the accessibility features and technical performance of Web OPACs of five South Asian National libraries: India, Sri Lanka, Bhutan, Bangladesh, and Nepal. It explores whether these OPACs meet international standards and how they perform on technical metrics such as load time, mobile compatibility, and content loading speed. The study also assesses the features present in these OPACs, like multilingual support, screen reader compatibility, etc., that help people from different linguistic backgrounds and also specially-abled ones. By evaluating these aspects, the research aims to provide insights into how South Asian libraries can enhance their OPAC systems to ensure accessibility and usability for all.

2. REVIEW OF LITERATURE

2.2 OPAC Features and Evolution

Several studies have examined the features and evolution of OPACs over time. Gupta (2018) addressed the gradual change of OPACs from printed catalogs to Web 2.0/3.0-enabled systems offering features such as faceted navigation, relevance ranking, and semantic searching. He particularly recommended that the introduction of these modern technologies enhances the usability of OPACs and encourages libraries to make efforts to improve user interaction. Naun (2010) looks into the history of OPACs, emphasizing newer versions of them, such as NCSU's Endeca, which is a reinterpretation of traditional cataloging to help people enhance their interaction. The study suggested that the OPAC systems do follow up those cataloging standards, however, improvements upon those cataloging methods will be needed to address the challenges posed in the digital world. Further, Hofmann & Yang (2012) studied certain features of OPACs in 260 academic libraries and found that the rate of taking up discovery tools had increased almost twice, indicating the growing adoption of faceted navigation and unified search interface. They also added that although there is a growing use of convenience discovery tools, the presence of OPACs, according to certain user groups, is still needed. Similarly, Moore & Greene (2012) discussed Blacklights' scalability and strong community support selected as the "open-source discovery layer at Indiana University Libraries". They also determined that Blacklight could address the library's requirements in terms of user experience enhancement while being ready for future changes. (Beheshti, 1997) illustrated the advancement of OPACs from a mere card catalog extension to a complex and comprehensive information retrieval system with "keyword access, Boolean search, and other advanced capabilities". The study found that despite the gains brought about by technology in the design of OPACs, it remains a challenge for users to come up with search queries. In an earlier study, Zumer & Zeng (1995) evaluated OPAC systems of the OhioLINK libraries and noted that there were considerable inconsistencies in the number of "access points and search formulation". They established that uniformity in access points and adequate knowledge enhancement to the users were necessary in order to satisfy different users.

2.2 Usability and User Satisfaction with OPACs

Several studies focused on the usability of OPACs and the satisfaction of users. (Ruzegea, 2012) investigated the usability of OPAC interfaces at the “International Islamic University Malaysia” and found that users were satisfied with the system’s performance but faced issues with unfamiliar features. The study suggested improvements like “tutorials and natural language query support” to enhance user experience. Si & Priyanwada (2016) surveyed OPACs utilized in the universities in Sri Lanka, and they noted user dissatisfaction due to the system being underdeveloped. They suggested improving technological infrastructure and incorporating native language support in order to increase user satisfaction. Kumar & Vohra (2013) compared the use of OPACs across three universities in Punjab and found that while many were aware of the OPACs but faced difficulty in using them effectively. They suggested that user education programs such as OPAC tutorials and assistance by the staff can improve OPAC usage in academic libraries. Gana, Ajibili, & Abel (2019) also reported low levels of usage and awareness of OPACs at Bingham University Library in Nigeria. The study concluded that awareness campaigns and user training are essential to promote OPAC usage. The same findings were also observed by Msagati (2016), who highlighted that only a few distance learners of the Open University of Tanzania had knowledge of OPAC systems, and even lesser used them often. The study suggested that it is necessary to include compulsory information literacy classes and to enhance internet infrastructure for distance learners to be able to use OPAC systems efficiently. Merčun & Žumer (2013) compared six online library catalogs and found that, while modern OPACs focus on functionality and Web 2.0 features, they lag behind from platforms like Amazon in terms of user experience. The study concluded that future OPACs should integrate more user-friendly search functions and personalized content. Meanwhile, Mi & Weng (2008) noted the overwhelming preference for the Google search engine rather than using OPAC, and therefore, the OPAC designs need to be restructured in a manner that will provide more “intuitive and user-friendly experiences”.

2.3 Enhancing OPAC Accessibility and Usability

Several studies have addressed improving OPAC accessibility and usability to ensure more inclusive library systems. Singh & Gangopadhyay (2017) explored the digital divide in higher education and found that lack of access to OPAC systems and limited awareness about their use

contributed to the divide. They suggested that academic libraries should improve OPAC accessibility, promote student awareness, and develop ICT infrastructure to provide equitable access to library resources. Ramesh Babu & O'Brien (2000) reviewed various Web OPAC interfaces that offered advanced features like keyword searching and Boolean operations, but there are still gaps in accessibility and usability, particularly for novice users. They concluded that OPAC systems need to be user-friendly and the users should be trained. Further (Ramesh Babu & Tamizhchelvan, 2003) found that OPAC is a critical tool for locating and retrieving resources, and to meet the diverse user groups, it needs to be developed more. Roy, Mukhopadhyay, & Biswas (2022) focused on using "VuFind" as an open-source discovery" layer for academic libraries, which integrated with systems like Koha and DSpace, improved access to library materials. The study recommended using cloud services and multilingual features. Bakrin, Mujidat, & Ogunrinde (2020) studied the visibility of OPAC systems in Nigerian universities, finding that many were not web-based, leading to low visibility. The authors suggested collaboration between librarians and ICT units to improve OPAC visibility through consortiums. Kalin (1991) addressed the challenges of remote OPAC users, often referred to as "invisible users," who encounter difficulties due to unfamiliarity with library systems. The study concluded that libraries must adopt online tutorials to improve system usability. Mukhopadhyay & Dutta (2020) explored the integration of language analysis tools with OPACs, specifically for analyzing and visualizing text in both mainstream and minority languages. They concluded that integrating these tools supports linguistic accessibility and recommended further development of Unicode-compliant tools for minority languages.

3. METHODOLOGY

3.1 Sample Selection

The study focuses on the Web OPACs of five national libraries from South Asia: the National Library of India(NLI), the National Library of Sri Lanka(NLS), the National Library and Archives of Bhutan(NLAB), the National Library of Bangladesh(NLB), and Nepal National Library(NNL).

These libraries were selected based on the accessibility of their Web OPACs during the data collection period. The sample excluded

National Libraries of Pakistan, Maldives, and Afghanistan due to the inaccessibility of their Web OPACs at the time of the study.

3.2 Data Collection

Data for the study was collected from the Web OPAC interfaces of these five libraries. Accessibility features such as User-Friendly Interface, Results Display, General Features and Functionality, Multilingual Support, etc., were evaluated based on their availability in the OPACs (as shown in Table 1). Technical performance data, including FCP, Speed Index, LCP, etc., were collected using Google PageSpeed Insights for both mobile and desktop devices (as shown in Table 2).

3.3 Hypothesis Testing

To assess whether there is a significant difference in the technical performance of Web OPACs across mobile and desktop devices, the following hypothesis was tested:

- **Null Hypothesis (H_0):** There is no significant difference in technical performance between mobile and desktop versions of Web OPACs.
- **Alternative Hypothesis (H_1):** There is a significant difference in technical performance between mobile and desktop versions of Web OPACs.

The “Mann-Whitney U test” was applied to compare the performance metrics across mobile and desktop devices. The analysis focused on the given technical performance metrics: “Overall Performance Score, First Contentful Paint (FCP), Total Blocking Time (TBT), Speed Index, Largest Contentful Paint (LCP), Cumulative Layout Shift (CLS), Page Size, and Load Time.”

4. DATA ANALYSIS

The data analysis was conducted using Microsoft Excel and Google PageSpeed. Later, SPSS software was used to test hypotheses.

5. FINDINGS

This section includes a tabular representation of the analyzed data.

Table 1 represents the following findings:

Table 1: Web OPAC Features Availability

Available accessibility Features		NLI	NLS	NLAB	NLB	NNL
1	User-Friendly Interface					
	a. Faceted Search Options	Yes	Yes	Yes	Yes	Yes
	b. Advanced Search Options	Yes	Yes	Yes	Yes	Yes
	c. Number of advanced search options	23	21	21	21	21
	d. Suggests alternate spelling for a search in English ("Did you mean...?")	No	No	No	No	No
	e. Ability to sort search results by relevancy, call number, date published (descending or ascending), date received, author A-Z or Z-A, or title A-Z or Z-A	Yes	Yes	Yes	Yes	Yes
	f. Ability for different advanced search methods					
	• Boolean Logic	Yes	Yes	Yes	Yes	Yes
	• Truncation	Yes	Yes	Yes	Yes	Yes
	• Phrase searching	Yes	Yes	Yes	Yes	Yes
2	Results Display					
	a. Display item format (text, icon, etc.) on the search result screens and the bibliographic record	Yes	Yes	Yes	Yes	Yes
	b. Ability to move forward and backward using browser buttons through search result screens, browse result screens (if available), and bibliographic records	Yes	Yes	Yes	Yes	Yes
	c. Ability to perform searches that can be limited to criteria such as home location, classification scheme, type of medium, format, collection, language	Yes	Yes	Yes	Yes	Yes
3	General Features and Functionality					
	a. OpenURL compliant	Yes	No	No	No	No
	b. Unicode compatible	Yes	Yes	Yes	Yes	Yes
	c. Availability of MARC view	Yes	Yes	Yes	Yes	Yes
	d. Availability of ISBD view	Yes	Yes	Yes	Yes	Yes
	e. Allow the inclusion of other data sources	Yes	No	Yes	Yes	Yes

(Table 1 Contd....)

(...Contd. Table 1)

4	Accessibility Features on Library Homepage					
	a. Screen Reader Compatibility	Yes	No	No	Yes	No
	b. Adjustable Text Size and Color Contrast	No	No	No	Yes	No
	c. Simultaneous access to multiple users	Yes	Yes	Yes	Yes	Yes
	d. Multilingual support	Yes	No	No	Yes	No
	• Number of languages provided	2			2	
5	Multilingual Support					
	a. In OPAC interface	Yes	Yes	Yes	Yes	Yes
	• Number of languages provided	67	2	66	78	78
6	Remote Access					
	a. 24/7 Availability	Yes	Yes	Yes	Yes	Yes
	b. Laptop/Desktop Compatibility					
	• Windows	Yes	Yes	Yes	Yes	Yes
	• macOS	Yes	Yes	Yes	Yes	Yes
	c. Mobile Compatibility	Yes	Yes	Yes	Yes	
	• Android					
	• iOS	Yes	Yes	Yes	Yes	Yes
	d. Browser Compatibility	Yes	Yes	Yes	Yes	Yes
	• Google Chrome	Yes	Yes	Yes	Yes	Yes
	• Safari	Yes	Yes	Yes	Yes	Yes
	• Mozilla Firefox	Yes	Yes	Yes	Yes	Yes
	• Microsoft Edge	Yes	Yes	Yes	Yes	Yes
7	Account Management and Authorization					
	a. Guest access to search	Yes	Yes	Yes	Yes	Yes
	b. Availability to create user accounts	Yes	No	No	No	No
	• Search History	Yes	Yes	Yes	Yes	Yes
8	Export and Sharing					
	Export records to citation software	Yes	Yes	Yes	Yes	Yes
	Print	Yes	Yes	Yes	Yes	Yes
	Share	No	Yes	No	Yes	No

User-Friendly Interface: All libraries provided a user-friendly interface with faceted search, Boolean logic, and phrase searching. However, **NLI** excelled by offering **23 advanced search options**.

Results Display: All the libraries provided a consistent format display on search result screens and the ability to move forward and backward between results. Additionally, all supported limiting searches based on location, classification, or format, enhancing usability across different user needs.

General Features and Functionality: While **NLI** was the only library to support OpenURL compliance, allowing for better integration with external resources, all libraries were Unicode compatible and provided views in both MARC and ISBD formats. **NLS** lagged behind in allowing the inclusion of external data sources.

Accessibility Features in Library Homepage: **NLI** and **NLB** were the only libraries that supported screen reader compatibility, an essential feature for visually impaired users. Additionally, **NLB was the only library to offer adjustable text size and color contrast**.

Multilingual Support: Multilingual support was robust in **NLB** and **NNL**, offering up to **78 languages** in their OPAC interfaces, while **NLI** and **NLAB** provided support for **67 and 66 languages, respectively**. **NLS** only supported two languages.

Remote Access: All libraries provided 24/7 availability, supporting both desktop and mobile platforms (Windows, macOS, Android, iOS), along with compatibility across major browsers like Chrome, Safari, Firefox, and Microsoft Edge.

Account Management and Authorization: **NLI** was the only library that offered user account creation, while other libraries only allowed guest access. All the libraries also had a search history feature.

Export and Sharing: All the libraries allowed users to export records to citation software and print the results. However, only **NLS** and **NLB** allowed users to share search results.

Table 2 revealed the following findings:

Overall Performance Score: **NLAB** recorded the highest performance score on both desktop (97) and mobile (94), indicating better web performance across devices. On the other hand, **NLI** recorded the lowest

scores for both desktop (80) and mobile (38), reflecting significant room for improvement in its web performance.

Table 2: Technical Performance Metrics

Technical Performance	NLI		NLS		NLAB		NLB		NNL	
	M*	D**	M	D	M	D	M	D	M	D
Type of View →										
Performance Indicators ↓										
Overall Performance Score	38	80	82	95	94	97	66	90	91	94
First Contentful Paint (FCP)	1.1 s	0.4 s	1.9 s	0.5 s	1.6 s	0.3 s	1.6	0.4 s	1.7s	0.5s
Total Blocking Time (TBT)	1850 ms	190 ms	110 ms	20 ms	10 ms	0 ms	10 ms	0 ms	0 ms	0 ms
Speed Index	14.3 s	5.3 s	4.3 s	2.2 s	5.4 s	1.7 s	9.4 s	2.8 s	7.2 s	2.4 s
Largest Contentful Paint (LCP)	12.1 s	1.5 s	4.1 s	0.8 s	2.0 s	0.7 s	7.6 sz	1.3 s	2.2 s	0.7 s
Cumulative Layout Shift (CLS)	0	0.001	0.003	0.03	0.001	0.036	0.003	0.039	0.002	0.001
Page Size	1.6 MB	1.5 MB	1.1 MB	1.1 MB	402.2 KB	402.2 KB	3.5 MB	3.5 MB	829.5 KB	829.5 KB
Load Time	9.87s	9.21s	10.44s	10.44s	3.22s	3.06s	14.24s	14.54s	3.17s	3.20s

*Mobile **Desktop

First Contentful Paint (FCP): NLAB recorded the fastest FCP on desktop (0.3s), meaning it displayed the first visual content quickly, enhancing user experience, while NLS and NNL had the slowest FCP of 0.5s. For mobile, NLI performed best with a fast FCP of 1.1s, while NLS had the slowest FCP (1.9s), meaning slower content display.

Total Blocking Time (TBT): NLAB, NLB, and NNL achieved optimal results with no blocking time (0ms) on the desktop, enhancing smooth interaction with the page. However, NLI had the highest TBT on desktop (190ms), indicating slower responsiveness. On mobile, NNL had no blocking time (0ms), while NLI had 1850ms of TBT.

Speed Index: NLAB had the best speed index on desktop (1.7s), indicating fast page loading. In contrast, NLI had the slowest speed index on desktop (5.3s). On mobile, NLS performed the best (4.3s), while NLI lagged with a slow speed index of 14.3s.

Largest Contentful Paint (LCP): NLAB and NNL recorded the fastest LCP on desktop (0.7s), meaning the largest visual elements loaded quickly. NLI had the slowest LCP (1.5s) on the desktop, meaning it took longer for significant content to load. On mobile, NLAB was the fastest (2.0s), while NLI had the slowest LCP (12.1s).

Cumulative Layout Shift (CLS): NLB had the highest CLS on desktop (0.039), indicating more unexpected shifts in page layout. In contrast, NLI and NNL had the lowest CLS on desktop (0.001), meaning more stable page layouts. On mobile, NLS and NLAB had the highest CLS (0.003 each), while NLI had the lowest (0).

Page Size: NLB had the largest page size for both desktop and mobile (3.5MB). NLAB had the smallest page size (402.2KB) for both desktop and mobile.

Load Time: NLAB had the fastest load time on the desktop (3.06s) due to the smaller page size. NLB, however, had the slowest load time on the desktop (14.54s) due to the larger page size. For mobile, NNL had the fastest load time (3.17s), while NLB again had the slowest (14.24s).

The findings from the Hypotheses testing varied for different metrics as follows:

Table 3: Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1.	The distribution of Speed Index is the same across categories of Devices.	Independent-Samples Mann-Whitney U Test	.016 ^a	Reject the null hypothesis.

(Table 3 Contd....)

(...Contd. Table 3)

2.	The distribution of Overall Performance Score is the same across categories of Devices.	Independent-Samples Mann-Whitney U Test	.151 ^a	Retain the null hypothesis.
3.	The distribution of First Contentful Paint (FCP) is the same across categories of Devices.	Independent-Samples Mann-Whitney U Test	.008 ^a	Reject the null hypothesis.
4.	The distribution of Total Blocking Time (TBT) is the same across categories of Devices.	Independent-Samples Mann-Whitney U Test	.421 ^a	Retain the null hypothesis.
5.	The distribution of Largest Contentful Paint (LCP) is the same across categories of Devices.	Independent-Samples Mann-Whitney U Test	.008 ^a	Reject the null hypothesis.
6.	The distribution of Cumulative Layout Shift (CLS) is the same across categories of Devices.	Independent-Samples Mann-Whitney U Test	.310 ^a	Retain the null hypothesis.
7.	The distribution of Page Size is the same across categories of Devices.	Independent-Samples Mann-Whitney U Test	1.000 ^a	Retain the null hypothesis.
8.	The distribution of Load Time is the same across categories of Devices.	Independent-Samples Mann-Whitney U Test	.841 ^a	Retain the null hypothesis.

Rejected Null Hypotheses

The null hypotheses for Speed Index ($p = 0.016$), First Contentful Paint (FCP) ($p = 0.008$), and Largest Contentful Paint (LCP) ($p = 0.008$) were rejected, indicating significant differences across devices. The Speed Index

varied notably, affecting the loading speed between desktop and mobile. Similarly, FCP and LCP differences showed that the time taken to display content differs across devices, impacting the user experience, especially on mobile, where optimization seems less effective.

Retained Null Hypotheses

The null hypotheses were retained for Overall Performance Score ($p = 0.151$), Total Blocking Time (TBT) ($p = 0.421$), Cumulative Layout Shift (CLS) ($p = 0.310$), Page Size ($p = 1.000$), and Load Time ($p = 0.841$). These metrics remained consistent across devices, suggesting that aspects like page size, load time, and layout stability provide a uniform user experience on both desktop and mobile platforms.

6. CONCLUSION AND SUGGESTIONS

Upon analyzing the Web OPACs of the five National Libraries, it was evident that while all libraries offered basic features essential for user accessibility, significant differences existed in advanced functionalities and technical performance. Libraries like Bhutan and Nepal showcased higher technical efficiency with faster loading speeds and lower blocking times, whereas India demonstrated room for improvement in several key metrics, including performance scores, blocking time, and load times. The libraries generally excelled in providing consistent results displays and multilingual support, though the inclusion of more advanced features like OpenURL compliance and screen reader compatibility remained inconsistent.

Libraries with lower technical performance metrics, particularly in load times and FCP, should consider optimizing their websites for faster content rendering, particularly on mobile platforms where delays can significantly impact user experience. Libraries that lack features such as screen reader compatibility and advanced search options should prioritize integrating these tools to improve accessibility for all users, including those with disabilities.

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6

Application of ChatGPT in Libraries: A Way Forward

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Abstract

This research article is to increase awareness and promote the use of Chat GPT in library services, specifically in terms of reference and information services. Emphasis is given to the integration and implementation of Artificial Intelligence in the future Libraries. The impact of AI is highly significant, especially on information-based organizations. ChatGPT is now a day in trends. Therefore, it will have an impact on Knowledge based research and content development. Chat GPT being a valuable tool, can assist, particularly is response to user's queries. However, it could not be a replacement for human librarians, who provide most authentic information. The authors have put an effort into bringing out possible aspects of the use of AI-based applications in Library services.

Keywords: ChatGPT, Library Service, Artificial Intelligence (AI), Library, Library & Information Science, Skill Development.

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1. INTRODUCTION

Chat GPT is a kind of Artificial Intelligence (AI). ChatGPT is an AI chatbot developed by OpenAI—a newly available Chatbot AI with pronounced synthesis and language capabilities (OpenAI, 2023). Just like previous applications, such as Twitter, Web 2.0 that revolutionized communication and influenced library services. ChatGPT and its use in the library services must be considered. Here, we introduce ChatGPT, its use of library services and possible advantages.

2. OBJECTIVES OF THE STUDY

The objectives of the study are as follows:

- (a) To discuss the impact of AI-based library services;
- (b) To highlight the impact of Artificial Intelligence,
- (c) To discuss the landscape for library opportunities;
- (d) To explore the AI-based ChatGPT applications in Libraries.

3. RESEARCH METHODOLOGY

This is a descriptive research outcome on the integration of Information and Communication Technologies and Open AI like ChatGPT application, this manuscript has been compiled on the basis of an online literature review and study.

4. ABOUT THE CHATGPT

Chat GPT (Generative Pre-Trained Transformer) is a language model developed by OpenAI, a research organization co-founded by Elon Musk and other entrepreneurs in 2020. ChatGPT is a public tool developed by OpenAI that is based on the GPT language model technology (Kirmani, 2022). It is a highly sophisticated chatbot that is capable of fulfilling a wide range of text-based requests, including answering simple questions and completing more advanced tasks such as generating thank you letters and addressing productivity issues (Liu *et al.*, 2021).

ChatGPT is an AI chatbot developed by OpenAI. It uses a type of artificial intelligence called a Large Language Model (LLM), specifically the GPT (Generative Pre-trained Transformer) architecture. This model has been trained on a vast amount of text data to generate human-like responses to text prompts. Here are some key features of ChatGPT:

- **Conversational AI:** It can engage in dialogue, answer questions, and assist with various tasks like writing, brainstorming, and learning.
- **Versatile Use:** People use ChatGPT for a wide range of activities, from studying and creative writing to coding and planning.
- **Continuous Improvement:** The model is regularly updated and improved to enhance its capabilities and accuracy.

ChatGPT is able to do this by leveraging its extensive data stores and efficient design to understand and interpret user requests and then generate appropriate responses in nearly natural human language. In addition to its practical applications, ChatGPT's ability to generate human-like language and complete complex tasks makes it a significant innovation in the field of natural language processing and artificial intelligence. The concepts behind GPT are refined through a two-step process: generative, unsupervised pretraining using unlabelled data and discriminative, supervised finetuning to improve performance on specific tasks GPT is able to perform a wide range of language-based tasks, including translation, question answering, and text generation.

5. HOW TO USE CHATGPT

The interface of Chat GPT is user-friendly, anyone can follow the steps indicated in fig. 1, first register on the Chat GPT Website using email ID and Password then verification takes place, provide user name and start using Chat GPT, then continue with chats as follows:



Fig. 1: Showing Steps of How to Use CHAT GPT

6. APPLICATION OF CHATGPT IN LIBRARY

Library and Information Science (LIS) professionals use various information communication technology tools to properly serve the public. Now, a day, most libraries are moving towards hybrid or fully

digital models with respect to the management of library resources and rendering services. The use of ChatGPT in Library is a relatively new but promising application significant development in research. In the context of library services research, Chat GPT can be used to automate certain tasks such as answering reference questions, providing recommendations for books or articles, and assisting with information retrieval. This can potentially free up library staff to focus on more complex and personalized patron interactions while also providing faster and more efficient service to patrons. There are the following major library services where Artificial Intelligence can be implemented:

1. **Book Recommendations:** ChatGPT can analyse user reading preferences and recommend books based on those preferences. This can be useful for users who are looking for new reading material.
2. **CATALOG Searching:** Library users can use ChatGPT to search the library catalogue for books, articles, and other materials.
3. **Collection Development:** Chat GPT can be used to assist librarians in collection development by analysing user queries on the basis of high demand. Chat GPT can also be used to analyse data on book circulation and popular trends in order to identify areas where the library's collection could be enhanced.
4. **Virtual Reference Services:** The application of Chat GPT in Libraries can be used to provide virtual reference services to library users. Users can ask questions through the chatbot and get answers automatically in real-time, 24/7.
5. **Reading Material Recommendations:** Chat GPT can be used to provide appropriate recommendations to users based on their reading materials and preferences.
6. **Translation Services:** Chat GPT can be used to provide language translation services to library users by integrating Chat GPT with translation tools, users can communicate with the library portal in their native language, and the chatbot can provide responses in the language of the user's choice.
7. **Language Learning:** ChatGPT can be used to serve as a language learning resource and practice. Users would interact with ChatGPT to practice speaking and writing in a new language.
8. **Library Accessibility to Disabled Users:** ChatGPT can be used to provide accessibility services for disabled users. For example, ChatGPT could be used to provide audio descriptions of visual content or to provide transcripts of video content.

9. **Promotion of Library Outreach Programs:** ChatGPT can be used to promote various library programs like seminars, workshops, etc. Users can interact with ChatGPT to learn more about upcoming events.
10. **User Engagement:** ChatGPT can help libraries engage with users through social media platforms, handling instant responses to messages and comments from library users.
11. **Research and Reference Assistance:** ChatGPT can help library users quickly find answers to specific questions they may have, such as how to locate a particular book, how to use library resources, or how to conduct research on a particular topic.
12. **FAQs:** ChatGPT can be integrated to answer frequently asked questions (FAQs) about the library's policies, services, hours, and other information.

Overall, ChatGPT can help library users to access information more easily and efficiently, improving their ability to conduct research and find the resources they need. ChatGPT can enhance the library user experience and support the mission of libraries to provide access to information and knowledge for all.

7. IMPACT OF CHATGPT ON LIBRARY PROFESSION

- a. **Library Professional Development:** ChatGPT is a helpful resource for library and information science professionals as their Professional development by providing open access to educational resources, such as online courses, tutorials, training materials, etc., to help them stay up-to-date with the latest trends and practices in the field.
- b. **Improvement of Information Management Skills:** ChatGPT can assist Library professionals in managing large amounts of information by providing tools for data analysis, organization, and retrieval, thereby helping to optimize their workflows and improve their productivity. Overall, ChatGPT can be a valuable resource for library and information science professionals, helping them to access information more quickly, efficiently, and accurately and supporting them in their work to advance knowledge and improve the quality of information services.

8. BENEFITS OF CHATGPT FOR LIBRARY SERVICES

ChatGPT can help librarian in the selection of books, journals, articles, and other resources over a wide range of subjects. With the help of ChatGPT

we can access online data, which can assist in giving customers more precise and thorough responses. When it comes to providing ChatGPT with particular and specialist information, these resources can be incredibly helpful.

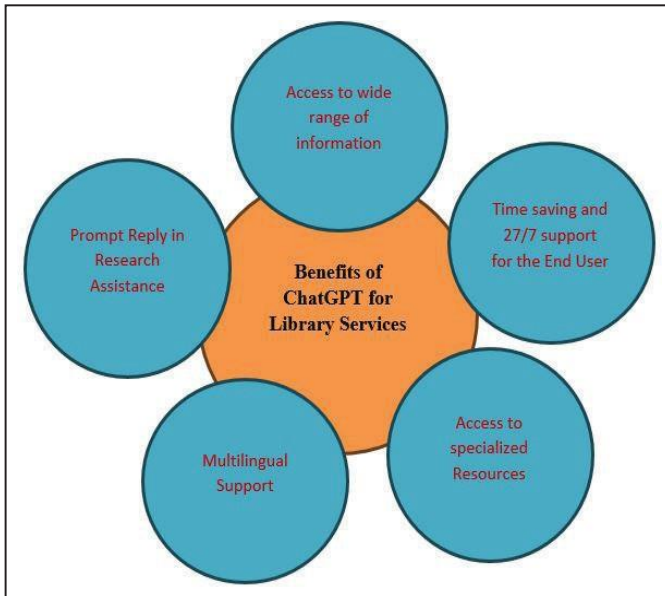


Fig. 2: Benefits of ChatGPT for Library Services

9. CONCLUSION

ChatGPT is a cutting-edge technology and application of Artificial Intelligence that can assist library professionals in offering various Library services. In this article, there has been discussed the possible prospects and opportunities of ChatGPT utilization by Library and Information Science professionals as well as the library users. Library and information science professionals have been dealing with various information services to users in traditional ways, which are being replaced by technology applications in Libraries. Finally, libraries shall work together with trending apps to benefit users in terms of content development, knowledge enhancement, and writing skill development.

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7

Artificial Intelligence (AI) Literacy in Indian Academic Libraries: Exploring the Insights from Library Professionals

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Abstract

This paper explores the artificial intelligence (AI) literacy among Indian academic library professionals with a total 417 respondents. The aim of this study is to understand their knowledge, awareness, and views on AI and its challenges and opportunities. The study deals with various aspects of AI knowledge, perspectives on AI in academic libraries, adopting AI tools and services, and ethical considerations. The findings reveal that the staff of academic libraries is generally aware of AI and its benefits in libraries. They consider that the application of artificial intelligence in the academic library has become pervasive. It includes expert systems for reference services, book reading, and shelf-reading robots, and also improves accessibility and supports decision-making. The findings also indicate that there is a lack of physical equipment and staff expertise in Indian academic libraries.

Keywords: Artificial Intelligence (AI), Open AI, ChatGPT, Library Services, Library and Information Science Digital Transformation, Library technologies

1. INTRODUCTION

Tracing the roots of Artificial Intelligence (AI) brings us back to the mid-20th century, a period marked by burgeoning interest in machine capabilities and their potential to mimic human intelligence. Among the early pioneers was Alan Turing, whose profound contributions laid the groundwork for modern computer science and AI (Audibert *et al*,

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2022). The advent of generative artificial intelligence (AI) marks a transformative era in technological progression, reshaping our interaction and integration with technology. This advanced AI genre, celebrated for its ability to create novel content and innovative solutions, catalyzes a revolution in diverse sectors. Artificial Intelligence (AI) has resulted in revolutionary changes that have improved the efficacy and efficiency of academic library services.

AI is changing academic libraries information delivery, organization, and search processes to make their services more effective and user-friendly. Artificial Intelligence (AI) is revolutionizing library services and enhancing user experience, creating a new era of efficiency, accessibility, and innovation. Integrating artificial intelligence (AI) into library services has grown increasingly popular, potentially transforming the sector by significantly enhancing routine library operations and services (Cox 2022). AI can improve services and operations in academic libraries by providing personalized recommendations, automating metadata creation, and enabling data-driven decision-making.

However, recent trends have shown an increasing reliance on AI in libraries to assist library professionals in their duties. This trend led to the emergence of smart, or 'intelligent' libraries, accelerated by the COVID-19 pandemic (Chen Zhou &Feng 2021). The infrastructure of a smart library comprises elements such as a data centre. AI-powered robots, wide visual screens, and dual identification methods for enhanced privacy protection (Gul&Bano, 2019).

2. OBJECTIVES OF THE STUDY

The need to address this research gap is highlighted by the rapid pace of AI development and integration in academic libraries. As AI continues to evolve and permeate further into academic libraries, the demand for AI literate library professional will only increase. Failure to understand their current state of AI literacy and identify the gaps could result in a significant skills deficit impedes the effective utilization of AI in academic libraries.

In view of this, the purpose of this study is to embark on an investigation of AI literacy among academic library professionals

- To examine the socio-demographic characteristics of Indian library professionals.

- To evaluate the perspective of Indian library professionals on AI usage in libraries.
- To find out the status of discrepancies in the perceived knowledge and proficiencies concerning AI technologies among Indian library professionals.
- To assess the potential usage of AI in the libraries.
- To measure the perception of Indian library professionals regarding the impact of AI technologies on library resources and services.
- To find out the AI tools and services currently used within Indian libraries.
- To examine the ethical considerations among library professionals on AI utilization.

3. LITERATURE REVIEW

Addressing the AI literacy gap in the library sector thus requires a concerned approach – one that offers comprehensive and layered educational strategies that bolster both theoretical understanding and practical familiarity with AI. The aim should not only be to impart knowledge but to empower library professionals to confidently navigate the AI landscape, to adopt and adapt AI technologies in their work effectively and, crucially, responsibly. Through such training and professional development initiatives, libraries can harness the potential of AI, ensuring they continue to be at the forefront of technological advancements (Lo, Leo, S., 2024). To integrate AI successfully, libraries must collaborate with professionals, researchers, and policymakers and adopt a continuing education approach to AI. Overcoming resistance to technological change, communicating efforts, and engaging staff are essential for libraries to leverage AI's potential and benefits and enhance their services and operations (Mallikarjuna, C., 2024).

Hasan, Nabiet. al. suggest that AI technologies have several benefits for libraries. They increase operational efficiency, boost information accessibility and provide personalised services to library users. Moreover, AI can aid in organising, examining data and suggesting resources, thereby allowing librarians to concentrate on more valuable work. But, ofcourse, the necessity for meticulous execution and ethical deliberations is emphasised by apprehensions around privacy, bias and job displacement.

According to Harisanty, Anna et. al. (2023), the libraries can smoothly integrate AI technologies to enhance administrative, technical, and informational functions. Libraries are already incorporating AI into various services, such as technical support and reference services, thereby improving user access to information (AI-Aamri& Osman, 2022).

Khan, et.al. suggest that academic libraries can benefit from IoT services by ensuring organizational readiness, user acceptance, technology infrastructure, and data security while considering ethical, legal, and social implications. Duncan (2021), discusses the opportunities for academic smart libraries in the Caribbean, emphasising the need for investment in technology and staff training to foster success.

4. METHODOLOGY

4.1 Research Design

This study adopted a survey based approach and statistical analysis to explore AI literacy among academic library professionals.

4.2 Sample Selection

The study employed stratified random sampling to select participants, encompassing library and information science professionals across multiple organization types, including Universities, Colleges, Management Institutes, Medical Institutes, and Research Institutes. The final sample comprised 417 participating library professionals. The questionnaire was distributed using a Goggle Form. Initial contact was established through targeted outreach, primarily utilizing Indian Library professional WhatsApp groups and academic institution email Ids.

5. DATA ANALYSIS AND DISCUSSION

Table 1: Characteristics of Library Professionals

Socio - Demographic Details Statements		Respondents	Percentage
Gender	Male	230	55.15
	Female	187	44.8

(Table 1 Contd....)

(...Contd. Table 1)

Educational Qualifications	Diploma	12	2.87
	BLIS	74	17.74
	MLIS	194	46.5
	M.Phil.	69	16.54
	Ph.D	60	14.38
	Others	8	1.91
Designation	Library Attendant	24	5.75
	Library Assistant	96	3.02
	Assistant Librarian/ Technical Officer/ Information Scientist	153	36.69
	Deputy Librarian Documentation Officer	103	24.70
	Director, (Library)/ Chief Librarian	23	5.51
		7	1.67
		4	0.95
7		1.67	
Institute Type	Management Institute	87	0.86
	Universities	73	17.50
	Colleges	178	42.68
	Technical Institute	41	9.83
	Medical Institute	23	5.51
	Research Institute	15	1.19
Working Experience	Less than 5 years	63	15.10
	5 to 10 years	167	40.04
	10 to 15 years	72	17.26
	15 to 20 years	52	12.47
	20 to 25 years	37	8.87
	More han 25 years	26	6.23

The study included a varied group of participants with 55.15% males and 44.8% females. It implies that male respondents are more from their counterparts.

Most had Master of Library and Information Science (MLIS) qualification (46.5%), followed by Assistant Librarian/ Technical Officer/Information Scientist (36.69%), colleges (42.68%) and universities (17.50%) were most represented institute types. In terms of experience, most had 5 –10 years of experience (40.04%) while (6.23%) had more than 25 years of experience. This study suggests a diverse sample of participants with different backgrounds and levels of experience in the library (Table 1).

Table 2: Professionals Views on AI in Libraries

S. No.	Awareness Regarding AI in Libraries	Yes (%)	No (%)
1.	AI has been utilized in libraries	95.44	4.56
2.	AI should be integrated into library services	92.32	7.68
3.	It can enhance and improve library services and activities	93.76	6.24
4.	AI's potential to enhance accessibility and inclusivity of library services	91.60	8.4
5.	AI applications to be transparent, explainable, and accountable in libraries	94.72	5.28
6.	AI's potential to assist comprehending and fulfilling user needs	90.88	9.2
7.	Willingness to receive training for using AI applications in library services	88.24	11.76

The analysis of Table 2 illustrates that library professionals widely recognize AI's presence (95.44%) and its application to be transparent, explainable, and accountable in libraries. Also it has been noticed that AI can enhance and improve library services and activities (93.76%), Whereas AI should be integrated into library services (92.32%) and willingness to train for its use (88.24%).

Table 3: Impact of Skills on AI implementation in Libraries: An Analytical Overview

S. No.	Relevance of Skills for AI Implementation in Library Settings	Percentage of Respondents	Number of Respondents
1.	Understanding of machine learning and deep learning algorithm	7.43	31
2.	Information architecture	11.25	53
3.	Programming skills	3.59	12
4.	Data analysis and data management skills	22.30	93
5.	Communication and collaboration skills	15.34	64
6.	Project management skills	18.94	79
7.	Ethical consideration	11.75	49
8.	Flexibility and adaptability	11.03	46
	Total	100	417

Table 3 provides a skill based analysis of AI implementation impact in libraries. Notably, library professionals were aware impact of skills on AI implementation such as data analysis and data management skills (22.30%), project management skills (18.94%), communication and collaboration skills (15.34%), ethical consideration skills (11.75%), information architecture (11.25%), flexibility and flexibility (11.03%).

Table 4: AI will Support Library in the Following Ways

S. No.	AI will Support Library in the Following Ways	Percentage of Respondents	Number of Respondents
1.	It will improve search capabilities	18.70	78
2.	It will improve accessibility	21.34	89
3.	It will improve the user experience	19.42	81
4.	Cost savings	18.70	78
5.	Increased efficiencies	12.70	53
6.	Enhanced discovery and access	7.43	31
7.	Preservation and conservation of resources	1.69	7
	Total	100	417

This analysis indicates that AI can support for libraries in the many ways. Findings shows that AI will improve accessibility (21.34%), it will improve the user experiences (19.42%), and also improve search capability (18.70%).

Table 5: Essential Consideration in the Application of AI Tools in Libraries

S. No.	Factors AI Integration in Libraries	Percentage of Respondents	Number of Respondents
1.	Human Resources	8.15	34
2.	User Privacy	10.79	45
3.	Library Professional's Willingness	21.82	91
4.	Funding/ cost	8.87	37
5.	Support and Planning of Universities	9.83	41
6.	Maturity and Reliability of AI Application	8.87	37
7.	Acceptance by Users	17.50	73
8.	Incorporating Library Core Values	4.79	20
9.	Managerial Concerns	16.54	69
	Total	100	417

From Table 5, the analysis of response from the users revealed perceptions regarding the impact of AI technologies on library resources and services. Several essential factors must be considered. The analysis depicts that Library professional's willingness (21.82%) followed by managerial concerns (16.54%), user privacy (10.79%), support and planning of universities (9.83%) are all critical factors to consider.

Table 6: AI Tools and Services Adopted by Your Institute Libraries (Multiple Answers were Followed)

S. No.	AI Tools and Services Adopted by Your Institute Libraries	Percentage of Respondents	Number of Respondents
1.	Optical Character Recognition (OCR)	36.69	153
2.	Chatbots	31.41	131
3.	Smart Shelving	20.86	87
4.	Automatic Metadata	7.67	32
5.	Text and Data Mining	20.86	87
6.	Image Recognition	23.26	97
7.	Natural Language Processing (NLP)	32.13	134
8.	Knowledge Graphs	5.75	24
9.	Speech Recognition	16.06	67

The finding shows that AI tools adaptations in institute libraries. This study reveal that 36.69% were using Optical Character Recognition

(OCR), Natural Language processing (32.13%), chatbots using (31.41%), image recognition 23.26%), smart shelving and text data mining (20.86%) in academic libraries.

Table 7: Perceived Urgency for Addressing Ethical and Privacy Concerns of Generative AI in Libraries

S. No.	Addressing Ethical and Privacy Concerns of Generative AI in Libraries	Percentage of Respondents	Number of Respondents
1.	Ethical and Privacy Concerns	12.47	52
2.	Need for Education and Training	24.94	104
3.	Potential for Misuse	5.27	22
4.	Concerns about Implementation	21.34	89
5.	Evaluating Ethical Implications of AI	9.83	41
6.	Participating in AI Discussions	16.30	68
7.	Providing Guidance on AI Resources	9.83	41
	Total	100	417

Table 7 presents the ethical considerations of AI application in libraries. Findings indicate notable ethical considerations. This study reveals that library professionals need for education and training of ethical and privacy concerns (24.94%), concern about implementation of AI (21.34%), participating in AI discussions (16.30%), and also (9.83%) need guidance on AI resources.

6. SUGGESTIONS

Based on the present study “Artificial intelligence (AI) Literacy in Indian Academic Libraries” an attempt has been made to suggest few suggestions. The main recommendations are as follows:

1. AI systems can inherit biases in the data used to train them. Library professionals may need to be cautious about the potential biases in the datasets power. AI tools, especially information retrieval.
2. AI tools rely on vast amounts of data to improve their performance. Library professionals must consider the privacy implications of collecting and using user data to enhance AI services. Ensuring compliance with privacy regulations and protecting user data from misuse is crucial.

3. Librarians are responsible for ensuring that AI services are ethically deployed and aligned with professional and ethical standards.
4. Library professionals need to assess the accuracy and reliability of AI generated contents.
5. Librarians should organize orientation programmes based on AI applications and fair use of information and datasets.

7. CONCLUSION

Based on the findings of this study, it is evident that library professionals in India have a strong awareness of AI technologies and their potential applications in libraries. Results indicate that most of the library professionals hold MLIS degrees and followed by Assistant Librarian/ Technical Officer/Information Scientist (36.69%), colleges (42.68%) and universities (17.50%) were most represented institute types. In terms of experience, most had 5 – 10 years of experience (40.04%) while (6.23%) had more than 25 years of experience. This study suggests a diverse sample of participants with different backgrounds and levels of experience in the libraries. Therefore, this result indicates a mature profession capable of AI understanding, usage and perception in the academic libraries. AI technologies are already being used in the library operations in India with respondents acknowledging the benefits of AI in improving efficiency, accessibility, and transparency in academic library services but a comprehensive understanding and readiness to implement these technologies remain less than ideal. This reality underlines the pressing need for an investment in targeted educational strategies and ongoing professional development initiatives. Ethical concerns such as intellectual freedom, accountability, and transparency are very essential considerations in using AI technologies in academic libraries.

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Awareness of Information Literacy Programs: A Survey of National Law Universities of North India

Dr. Sonam Singh¹ and Dr. Shalender Singh Chauhan²

Abstract

Information Literacy Programs orient users about the diversified resources available within a library. These programs have evolved as the most important task for library professionals during the worldwide pandemic times when only the online resources can be accessed by the research fraternity as the access to library and information centers was barred considering spread of corona virus. Present study takes into account the study of information literacy programs being organized by National Law Universities of North India. A well-structured questionnaire was distributed among faculty members and research scholars to know their perception towards the information literacy programs and enhanced usage of electronic resources thereof. The study reveals that most of the faculty members and research scholars are aware about the IL programs as organized by their universities and a good numbers are attending these programs. Some of the users are not able to distinguish between the subscription based and open access resources. The IL programs must be designed to orient the users about this difference along with the objective of maximum utilization of e-resources.

Keywords: Information Literacy Programs, User Orientation Programs, Electronic Resources, Online Databases, Law Libraries, National Law University (NLU)

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1. INTRODUCTION

Information literacy is a survival skill in the Information Age. In the age of ICT, vast amount of information has flooded our lives and in order to sail through this abundance of information, information literacy enables us to find, evaluate and use information wisely to solve a problem and make decisions thereof. The source of the information can be a book, a computer, a government agency, a film or many different possible resources. Usually, libraries at no cost are providing momentous public access points for such information and plays a important role in developing human resource for delivering information and knowledge for fulfilling the demand of today's knowledge society.

Just as public libraries were once a means of education and a better life for many as the potentially strongest and most far-reaching community resource for lifelong learning. Public libraries not only provide access to information, but they also remain crucial to providing people with the knowledge necessary to make meaningful use of existing resources (ALA, 1998).

2.1 Definitions of Information Literacy

According to ALA "Information literacy is a set of abilities requiring individuals to "recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information"

Information literacy is knowing when and why you need information, where to find it, and how to evaluate, use and communicate it in an ethical manner" (CILIP, 2005).

"To be information literate, a person must be able to recognise when information is needed and have the ability to locate, evaluate, and use effectively the needed information" (American Library Association, 1998)

"Information literacy is the adoption of appropriate information behaviour to obtain, through whatever channel or medium, information well fitted to information needs, together with critical awareness of the importance of wise and ethical use of information in society" (Johnston and Webber, 2003).

"... all these literacies [basic literacy, scientific literacy, technological literacy, visual literacy, cultural literacy] can be considered as specific competences that belong under the information literacy umbrella.

Therefore information literacy should be considered as a container concept, which refers to competences of people to recognize the need for information and to satisfy their information needs for survival, self-actualisation and development” (Boekhorst, 2003a).

2. OBJECTIVES OF THE STUDY

The major objectives of the study have been following:

- (i) To know the awareness among faculty members and research scholars about the organization of Information Literacy Programs
- (ii) To ascertain the attendance of faculty members and research scholars for Information Literacy Programs
- (iii) To investigate the reasons for not attending the Information Literacy Programs
- (iv) To determine the satisfaction level of faculty members and research scholars with Information Literacy Programs for proper usage of electronic resources
- (v) To know about the source of providing Information Literacy Programs
- (vi) To discover about the awareness of faculty members and research scholars about Open Access resources through Information Literacy Programs

3. SCOPE OF THE STUDY

The major objective of the study has been to ascertain the level of awareness of faculty members and research scholars about the Information Literacy Programs as organized by National Law Universities of North India. At present there are 26 National Law Universities which are established in almost every state of India. The scope of the study has been limited to the National Law Universities of North India. The institutions selected for the study are as follows:

1. Ram Manohar Lohia National Law University, Lucknow,
2. Rajiv Gandhi National University of Law, Patiala
3. National Law University, Delhi.
4. Himachal Pradesh National Law University, Shimla

The type or category of the users selected for the study comprises Faculty members and Research Scholars only. Students pursuing Masters and Undergraduate students have not been included in the study considering the diversified research requirements among user groups.

4. RESEARCH METHODOLOGY

For collecting the relevant data, a well structured user questionnaire was designed and distributed among faculty members and research scholars of the select National Law Universities of North India. A total of 327 copies of questionnaires were administered among users out of which 235 questionnaires were returned and found useful for analysis. 100 and 135 filled copies of questionnaires were received from faculty members and research scholars respectively. The collected data and results therein were presented in tables and then analyzed through Excel worksheets. MLA Style (9th edition) has been used for giving references in the whole study.

5. REVIEW OF LITERATURE

In recent years, information literacy in law schools has become a subject of great interest to law librarians (**Harker, 2013**). Information literacy programs educate users on the use of learning resources and about the maximum utilization of electronic resources in digital age. These programs requires to be included in service training programs and should be available as part of teachers' ongoing professional development so that they can efficiently educate their users about the use and utilization of teaching and learning resources (**Arya, 2014**). In most cases users are well aware about information literacy programs. Their preferred contents were library, subject, and research related contents so that they can identify need, resources to access and authenticate the available information to fulfill their academic needs (**Zeeshan et. al, 2020**). There are some barriers also in successful implementation and running of information literacy programs. Lack of integrated information literacy into course curricula of certain institutions acts as a barrier to effective information literacy programs (**Agyekum, 2017**). Subject specific information literacy education has become important component of information literacy programs in universities. To enhance the ability of legal information and knowledge, information literacy programs are required to be designed in a way which can provide effective use of legal sources and handle legal information (**Xing and Su, 2019**). Lack of university commitment to information literacy programs, lack of regular conduction of information literacy programs and reluctance of stakeholders to incorporate information literacy programs into the curriculum are the hindering factors for effective implementation

and execution of information programs in law university libraries **(Umar and Habib, 2022)**. Information literacy skills required to be undertaken in compliance with academic staff in order to achieve maximum utilization of resources. Academic Law librarians in India are involved in activities to support legal information literacy **(Alam and Mugade, 2016)**. Professional development programs are significant to improve the ability of acquiring competencies in using and accessing information and more particularly information literacy requires sustained development **(Kumbhar, 2018)**. Overload of information sometimes causes demotivation and frustration to users, therefore well structured information literacy instruction sessions are required to be carried out by the academic librarians for their clientele **(Harrison and Deans, 2021)**. Information literacy should be made a regular activity in the higher learning and academic institutions considering its vast need for survival in contemporary digital environment. To convert users to lifelong learners and critical thinkers, information literacy programs are required to be introduced at school level nurtured at university, public and research library level to achieve library goals **(Thanuskodi, 2019)**. To improve information literacy competencies librarians should take the lead with collaboration of faculty, IT specialists and students. In offering effective information literacy, library clienteles are required to be oriented with all the practical of IL such as resource literacy, research literacy, publishing literacy and tool literacy **(Dang et.al, 2022)**.

6. DATA ANALYSIS AND INTERPRETATION

The responses of faculty members and research scholars of select National Law Universities of North India about their perception towards information literacy programs has been assimilated under following parameters and further been analyzed through various tables and figures to fetch the objectives of the study.

6.1 Organization of Information Literacy Programs by National Law Universities of North India

Table 1 clearly specifies that a majority of faculty members and research scholars are aware about the organization of information literacy programs on use of e-resources. It can be seen from the table that 96.2% faculty members and research scholars of RGNUL, Patiala followed by

94.50% of RMLNLU, Lucknow , 92.90% of Delhi and 92.60% faculty members and research scholars of HPNLU, Shimla are well aware about organization of such programs by their universities.

Table 1: Awareness about Organization of Information Literacy Programs by NLUs of North India

		Yes	No	Can't Say	Total
University Affiliation	HPNLU Shimla	50	3	1	54
		92.60%	5.60%	1.90%	100.00%
	NLU Delhi	52	0	4	56
		92.90%	0.00%	7.10%	100.00%
	RGNUL Patiala	50	0	2	52
		96.20%	0.00%	3.80%	100.00%
	RMLNLU Lucknow	69	4	0	73
		94.50%	5.50%	0.00%	100.00%
Total		221	7	7	235
		94.00%	3.00%	3.00%	100.00%

It is a good sign that the National Law Universities of North India are organizing information literacy programs which will not only make users aware about the availability of resources within an institution but also promote and enhance the use of resources up to maximum utilization among academic fraternity.

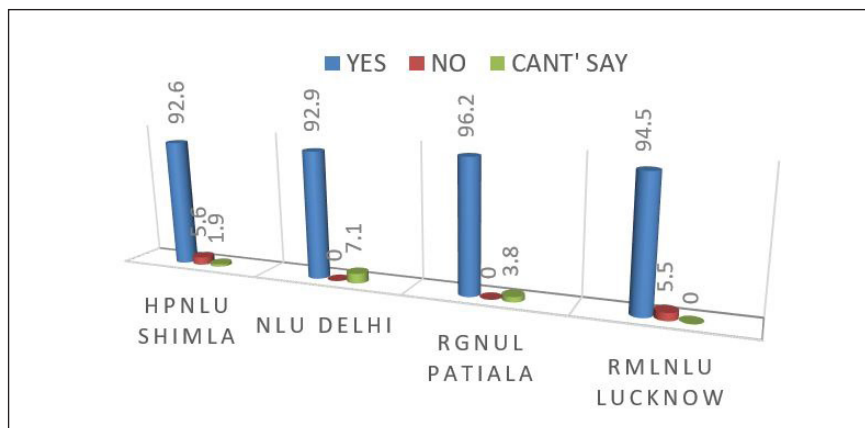


Fig. 1: Awareness about Organization of Information Literacy Program by NLUs of North India

6.2 Attending Information Literacy Programs by Faculty Members and Research Scholars

Table 2: Attending Information Literacy Programs by Faculty Members and Research Scholars

		Yes	No	Can't Say	Total
University Affiliation	HPNLU Shimla	45	8	1	54
		83.3	14.80%	19%	100.00%
	NLU Delhi	47	3	6	56
		86.9	5.40%	10.70%	100.00%
	RGNUL Patiala	49	2	1	52
		94.30%	3.80%	1.90%	100.00%
RMLNLU Lucknow	64	7	2	73	
	87.70%	9.60%	2.70%	100.00%	
Total		208	20	10	235
		87.20%	8.50%	4.30%	100.00%

Table 2 shows that most of the faculty members and research scholars of NLUs of North India are attending the Information Literacy Programs organized by their universities libraries. 94.3% faculty members and research scholars of RGNUL, Patiala followed by 87.7% RMLNLU, Lucknow, 86.9% NLU, Delhi and 83.3% HPNLU, Shimla faculty members and research scholars are attending these programs.

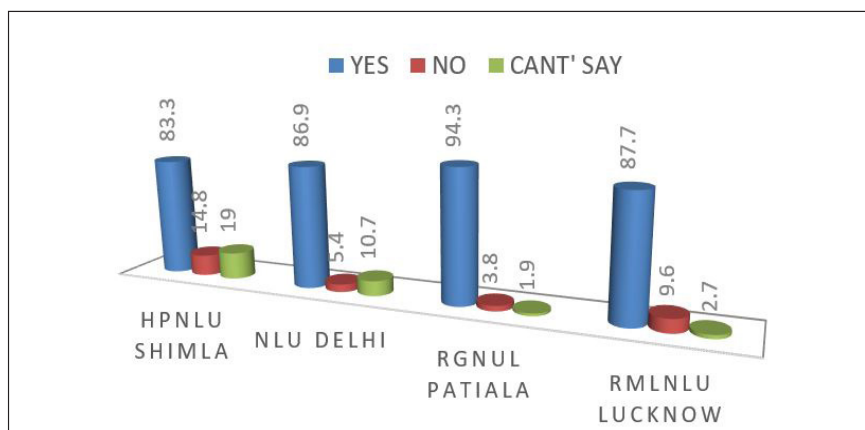


Fig. 2: Attending Information Literacy Programs by Faculty Members and Research Scholars

Attending information literacy programs enables users to know about the available resources within a library and make them capable enough for maximum utilization of these resources.

The reasons for not attending the information literacy programs in some cases have been analyzed in the forthcoming table and chart.

6.2.1 *Reasons for not Attending Information Literacy Programs by Faculty Members and Research Scholars*

Table 3 investigates the reasons for which faculty members and research scholars have not been attending Information Literacy Programs.

Table 3: Reasons for not Attending Information Literacy Programs by Faculty Members and Research Scholars

		Unawareness about Such Trainings	No Such Facility from Library	Not Feel Necessary for Legal Research	Prefer Print Resources over E-Resources	None of the above	Total
University Affiliation	HPNLU Shimla	6	5	0	4	39	54
		11.10%	9.30%	0.00%	7.40%	72.20%	100.00%
	NLU Delhi	3	1	0	0	52	56
		5.40%	1.80%	0%	0%	92.90%	100%
	RGNUL Patiala	1	0	1	1	49	52
		1.90%	0%	1.90%	1.90%	94.20%	100%
RMLNLU Lucknow	2	2	4	4	61	73	
	2.70%	2.70%	5.50%	5.50%	83.60%	100%	
Total		12	8	5	9	201	235
		5.10%	3.40%	2.10%	3.80%	85.50%	100.00%

Four options were given as the reasons for not attending Information Literacy Programs along with one option as 'None of the above' option. Very few faculty members and research scholars such as 5.1% says that they are unaware about such training programs, 3.8% says that they prefer print resources over e-resources and 3.4% agrees that they are not aware such facility from library. These reasons seem very limited for not attending Information Literacy Programs as most of the faculty members and research scholars have opted the 'None of the above' option (85.5%).

6.3 Satisfaction with Information Literacy Programs for Proper Usage of E-resources by Faculty Members and Research Scholars

Table 4 is the reflection of satisfaction level of faculty members and research scholars towards Information Literacy Programs for proper usage of E-resources. Table 4 clearly specifies that faculty members and research scholars are of the strong view that the Information Literacy Programs are good source of information about proper usage of e-resources. 98.2% NLU, Delhi followed by 98.1% HPNLU, Shimla, 92.3% RGNUL, Patiala and 91.8% RMLNLU, Lucknow faculty members and research scholars says that they find it good to organize these programs to enhance the usage of e-resources.

Table 4: Satisfaction with Information Literacy Programs for Proper Usage of E-resources

		Yes	No	Can't Say	Total	
Total	HPNLU Shimla	53	0	1	54	
		98.10%	0.00%	1.90%	100.00%	
	NLU Delhi	55	1	0	56	
		98.20%	1.80%	0.00%	100.00%	
	RGNUL Patiala	48	0	4	52	
		92.30%	0.00%	7.70%	100.00%	
	RMLNLU Lucknow	67	0	6	73	
		91.80%	0.00%	8.20%	100.00%	
	Total		223	1	11	235
			94.9	0.40%	4.7	100.00%

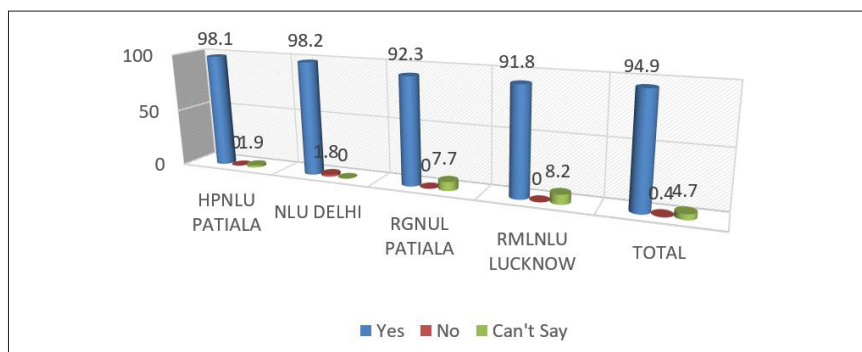


Fig. 3: Satisfaction with Information Literacy Programs for Proper Usage of E-resources

Figure 3 show that 94.9 % faculty members and research scholars of all the four NLUs of North India agree that organizing Information Literacy Programs with regular intervals enhance the usage of e-resources.

6.4 Source of Providing Information Literacy Programs

The orientations of various e-resources under Information Literacy Programs are provided through multiple sources such as directly from database providers, through publishers, through outside subject experts and also through library professionals. Table 5 gives a glimpse about the sources of these information literacy programs to faculty members and research scholars of NLUs of India.

Table 5: Source of Providing Information Literacy Programs

		Database Trainers	Library Professionals	Both	None of them	Total
University Affiliation	HPNLU Shimla	7	6	39	2	54
		13.00%	11.10%	72.20%	3.70%	100.00%
	NLU Delhi	3	14	39	0	56
		5.40%	25.00%	69.60%	0.00%	100.00%
	RGNUL Patiala	15	7	30	0	52
		28.80%	13.50%	57.70%	0.00%	100.00%
RMLNLU Lucknow	8	33	30	2	73	
	11.00%	45.20%	41.10%	2.70%	100.00%	
Total		33	60	138	4	235
		14.00%	25.50%	58.70%	1.70%	100.00%

Table 5 shows that 72.2% HPNLU, Shimla faculty members and research scholars says that the training for databases is provided by both i.e by database trainers and library professionals followed by 69.6% NLU, Delhi, 57.7% RGNUL, Patiala faculty members and research scholars. However, 45.2% RMLNLU, Lucknow faculty members and research scholars says that the training for databases is provided by library professionals and at the same time, 41.1% says that the database training is provided by both i.e. database trainers and library professionals.

Figure 4 also shows that more than 50% i.e., 58.7% faculty members and research scholars says that the orientation/training/information literacy

program for e-resources is provided by both i.e., by database trainers and library professionals. This shows a good sign that library professional are well trained to provide the orientation program to their users.

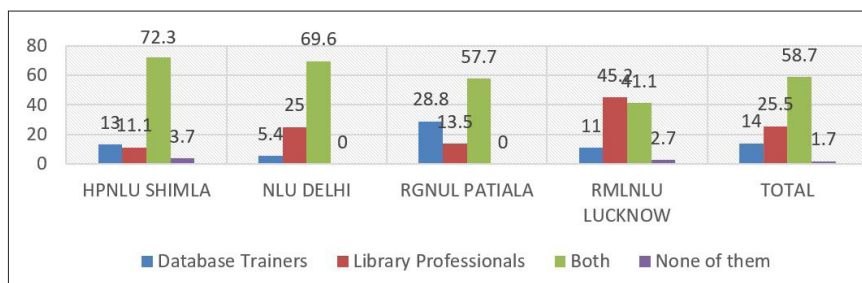


Fig. 4: Source of Providing Information Literacy Programs

6.5 Awareness about Open Access Legal Databases through Information Literacy Programs

Besides educating the subscription based resources, educating about various open access resources is also a very important component of Information Literacy Programs. Table 6 indicates the awareness of faculty members and research scholars about open access resources through Information Literacy programs.

Table 6: Awareness about Open Access Resources through Information Literacy Programs

		Yes	No	Can't Say	Total
University Affiliation	HPNLU Shimla	39	8	7	54
		72.20%	14.80%	13.00%	100.00%
	NLU Delhi	42	4	10	56
		75.00%	7.10%	17.90%	100.00%
	RGNUL Patiala	16	25	11	52
		30.80%	48.10%	21.20%	100.00%
	RMLNLU Lucknow	42	20	11	73
		57.50%	27.40%	15.10%	100.00%
Total	139	57	39	235	
	59.10%	24.30%	16.60%	100.00%	

75% faculty members and research scholars from NLU, Delhi followed by 72.2% HPNLU, Shimla says that information literacy programs educate them about open access resources. However, 30.8% RGNUL, Patiala and 57.5% RMLNLU, Lucknow faculty members and research scholars agrees that the information literacy programs gives them information about open access resources. At the same time, 48.1% RGNUL, Patiala and 27.4% RMLNLU, Lucknow faculty members and research scholars denies such orientation about open access resources through information literacy programs.

Information Literacy Programs should be designed and provided in a way which clearly indicates about the open access resources as these are important source of information related to research in legal information and resources.

7. FINDINGS AND OBSERVATIONS

The current study traces about the awareness and perception of faculty members and research scholars about the Information Literacy programs as organized by their universities. Information Literacy programs are useful for enhancing the usage of resources by the users of an institution. These programs not only orient users about various resources available within a university library but also are able to increase the optimum usage of resources. The findings based on the analysis and interpretation of data is presented as under:

1. The study reveals that most of the Faculty members and Research scholars are aware about information literacy programme organized by NLUs under study. 94% faculty members and research scholars of National Law Universities of North India are aware about the information literacy programs. It is a good sign that the National Law Universities of North India are organizing information literacy programs which will not only make users aware about the availability of resources within an institution but also promote and enhance the use of resources up to maximum utilization among academic fraternity.
2. 87.2% faculty members and research scholars are attending the Information Literacy Programs organized by their universities libraries. Attending information literacy programs enables users to know about the available resources within a library and make them capable enough for maximum utilization of these resources.

3. Faculty members and research scholars are of the strong view that the Information Literacy Programs are good source of information about proper usage of e-resources. 94.9 % faculty members and research scholars of all the four NLUs of North India agree that organizing Information Literacy Programs with regular intervals enhance the usage of e-resources.
4. 58.7% faculty members and research scholars says that the information literacy programme is provided by both i.e., by database trainers and library professionals. This shows a good sign that library professional are well trained to provide the orientation program to their users.
5. Open access resources are important source of information related to research in legal information and resources. 59.1% faculty members and research scholars says that information literacy programs educate them about the open access legal resources. At the same time 24.3% faculty members and research scholars says that information literacy programs does not educate them about open access legal resources. To bridge this gap, it is suggested that Information Literacy Programs should be designed and provided in a way which clearly indicates about the open access resources.

8. CONCLUSION

The abilities and understandings promoted by the law universities stakeholders are required to be performed in synchronization with faculty, IT specialists and potential users in the current information environment for delivery information literacy content. With the change of technology, users will need to know how to access and utilize the functionalities of the devices and the growing wealth of information available on different platforms. Besides this, they will also require to know about the effective use of information and to contribute to the creation of content in making informed decisions for the benefit of themselves and others. Faculty members and research scholars of NLUs of North India are aware about the organization of information literacy programs and to the some extent are attending the same. The National Law Universities should maintain certain policy and guidelines about organization of information literacy programs so that the utilization of library resources can reach the optimum level. Open access resources are important source of information related to research in legal information and resources. Information Literacy Programs should be designed and provided in a way which clearly

indicates about the open access resources. Also information literacy programs are required to be structured as a curriculum tool for providing effective use of legal sources and handle legal information. As this will increase the practical impartation of information literacy in Law libraries and result in excellent service delivery, librarians and management are required to monitor the welfare of all library staff, motivate them in carrying out their roles and duties, and also combat the negative narrative on staff motivation, inclusivity, and collaboration.

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Bibliometric Study of Research Output of Indian Institute of Tropical Meteorology (IITM), Pune, India

Shompa Das¹ and Uday Suresh Deoghar²

Abstract

Over the past few years, several examinations have been conducted to show the research productivity of the institutes by applying various analytical tools and methods. The main aims of these studies were to demonstrate the different research areas and the comprehensiveness of collaborative research in the institutions. This analytical study examines and demonstrates the substantial research growth on various topics conducted at IITM, Pune. To investigate this, we have approached to conduct a bibliometric analysis of the data from the period 2016 to 2020. This data was extracted from the Web of Science, and the authors have considered the scholarly articles published in peer-reviewed journals using the database of an in-house developed institutional repository for publication. The analysis reflects the citation overviews, including meso and micro-level topics, affiliations of various institutes at the departmental level, research productivity, research area, and collaborative approach toward research with different countries. The examination also represents the institute's willingness and efforts towards SDGs. Most of the documents were written on SDG 13(Climate Change), as the institute is renowned worldwide for its research on climate change and weather forecasts. A comprehensive research output of 812 publications (as per WoS) and 855 publications (per the IITM-IR) was collected. The average citation and H-index of the institute are found to be 23.86 and 59, respectively. The analysis shows the top 5 most productive areas of research publications

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by the institute's researchers; Meteorology Atmospheric Sciences was found to be highest with 493 publications (60.71%), followed by Environmental sciences with 176 publications (21.67%).

Keywords: Bibliometric analysis, Citation analysis, Web of Science, Indian Institute of Tropical Meteorology, Publications, Institutional Repository

1. INTRODUCTION

The variation in climate affects humanity on various ends. Humankind is facing the most severe environmental tragedy since its evolution. All the world's countries are facing economic, social, and human losses due to the tragedy of climate change. Many efforts are being made to protect it from its significant effects. The boom of scientific activity in the last few years has increased the predictions regarding this kind of tragedy. Many countries are working globally and collaborating to predict the occurrence and impact of these activities. Developing countries are facing these kinds of tragedies on a more remarkable account, and India is one of them. Due to its geography, India faces the effect of climate change on a more considerable note. Many institutes are working in the country to predict these effects.

The Indian Institute of Tropical Meteorology is a primary center for research in climate change and weather forecasting. A bibliometric analysis is conducted to investigate the institute's research productivity and citation analysis.

Bibliometrics means studying bibliographic data by applying statistical tools and methods to describe the distribution patterns of articles. Bibliometric analysis refers to the evaluation of research output related to the scattering of articles, geographical distribution, language-wise distribution, institution-wise distribution of articles, the age distribution of documents, distribution of citations - subject, author, language, type, journal, etc., to study the trends in research, and identifying the growth of literature (Epg - pathshala). This analysis technique has been applied mainly to the scientific fields. It is based principally on various metadata elements like author, title, subject, citations, etc, related to scholarly publications within a discipline (Arikrishanan R. *et al.*, 2016).¹ Citation analysis is being used to evaluate research contributions made by the scientific community. It is used to count citations of particular research institutes or scientists. Citation analysis is a method that provides a connection between cited and cited documents. Citation counts provide

a significant picture showing the impact of each scientist's research output, including that of his organization, on the country and world levels. Researchers in this field have used various parameters, viz, number of papers, citation received, H-index, the impact factor of journals, etc., to measure the research outputs.

2. ABOUT THE INDIAN INSTITUTE OF TROPICAL METEOROLOGY

IITM is an autonomous research institute under the Ministry of Earth Sciences, Government of India. It is recognized as a national center for basic and applied research in Meteorology and Atmospheric Sciences (<http://www.tropmet.res.in/>). Scientists of the Institute have published 3373 papers in peer-reviewed journals to date. The present study analyses the scholarly articles published in peer-reviewed journals by IITM researchers during 2016-2020 using the Web of Science database and the IITM institutional repository. The study examines the institutes' research productivity, citation overview, top research areas, collaborating partners and countries, publishers, and researchers' profiles.

3. REVIEWS OF PREVIOUS RESEARCH

Nowadays, almost every institute in the field of knowledge universe conducts bibliometric statistical methods to measure their institute's research outputs. Here, we have also referred to some studies for our research which different institutes conduct.

Hasan, N. and Singh, M. (2015) have attempted to evaluate the research trends and outputs of the top five IITs in India, which are also ranked under the top 20 institutions of BRICS countries. The share of India was only 215019 (2.72%) articles to global records (7,894,639) as indexed in the database. The study was conducted on the data excluded from the Web of Science database for 2009-2013. They examined the annual research outputs, the IITs' share in research papers in India, the degree of collaboration among IITs at the global level, and the institute's comparative citation data. It was accounted that the highest number of articles was published in the year 2013 (49406/ 22.98%). A highly productive institute among IIT was IIT Kharagpur, with 5271 articles, followed by IIT Madras. IIT Kanpur collaborated maximum with the other four IITs, which is 4.05% of its total articles. The USA was topped in collaboration with other countries category. IIT Bombay has received

the highest citations and has secured a maximum H-index of 45. The study gives a base for initiating new research projects among researchers and policymakers and defines the need for more collaboration in the area.

Canas-Guerrero, Ignacio, *et al.* (2013) checked and evaluated the research activity in the subject category "Agronomy" in the Web of Science database from 1997 to 2011. The main focus was on articles and reviews, and every article was analyzed using quantitative and qualitative parameters (number of publications, international collaborations, authors, research centers, year impact factor, and number of citations per article). The analyses conclude that an irregular growth of 51% in publications since 1997 is observed. English is the most used language, with 92.4% of publications published. A great diversity was found within agronomy for research topics where only 7% of the more than 135,734 keywords appear in more than ten articles; during the entire period, the pillars of research in agronomy are relatively unchangeable. It shows increased collaboration on all scales (authors, centers, and countries), indicating greater globalization and research structuration. The USA was found to be the most important in publication productivity, with 22.5%. The widespread diffusion of publications in high-impact factor journals with centers in principal countries was seen.

Falagas, M. K. *et al.* (2016) conducted a bibliometric analysis of global trends of research productivity in tropical medicine from 1995-2003; the data was extracted from 12 journals included in the tropical medicine category of the JCR database of the ISI. The world was classified into nine regions based on geographic, economic, and scientific criteria. The results show that developing areas of the world, including Africa, Asia, Latin America, and the Caribbean, may need more help from developed countries to produce more research in tropical medicine. Instead of creating more research output from Western European countries, articles from the USA have the highest mean impact factor (1.65). Interestingly, the total number of publications in tropical medicine compares somewhat unfavorably to other medical fields of significant importance to humanity. The study limits that the quality of articles was not depicted based on the impact factor of the journals. The study estimates research productivity in tropical medicine by different world regions.

Researchers Siwach, A. K. and Kumar, S (2015) investigated Maharshi Dayanand University, Rohtak's research contribution in terms of its publications from 2000-2013 as reflected through the Scopus database.

The study examines the citations impact, research productivity, national and international collaborations, top collaborating institutions, subject-wise distribution of authors, journals used for communication, most preferred journals for publication, most prolific authors, number of citations received, and top cited papers of the University during the period under study. The study found that the highest number of documents (219) were published in 2013 and the lowest (30) in 2001. It was also found that Guru Jambheshwar University Hisar was the main collaborator with 66 papers, followed by Kurukshetra University, Kurukshetra (45), and two institutes from South Korea were in the lead regarding international collaboration. Chemistry was the most productive subject, and Pundir, C. S. was the author. A uniform citation pattern was observed in the study.

4. METHODOLOGY AND SCOPE OF THE STUDY

For the present study, we have collected data from databases viz., Web of Science and IITM Institutional repository. To manage the IITM research output (peer-reviewed publications) daily, IITM Library Professionals have developed the in-house software for Institutional Repository (IITM-IR). Technical details are provided by Sapre and Das (2016). This developed IR contains records from 1964 onwards. Web of Science database has been considered for extraction of research output, citation overview, collaborating partners and subject areas, etc. The statistical methods used in the bibliometric analysis are used for the present study, which includes collecting information regarding research articles published by IITM researchers during the period considered for the study, i.e., 2016-2020. The details regarding each published article, such as the article's title, the number of authors, the title of the journal, and the subject area, have been extracted and analyzed for the observations.

5. DATA ANALYSIS, INTERPRETATION, AND DISCUSSION

The data of all 855 articles published during 2016-2020 in peer-reviewed journals by IITM, which are available in IITM-IR and 812 articles extracted from Web of Science online database by giving the queries to refined by affiliation and again refined by publication years: 2016 OR 2017 OR 2018 OR 2019 OR 2020 (Query link: <https://www.webofscience.com/wos/woscc/summary/e27056a1-9a8c-4a2c-bbc1-07f3dd81d313-0106e0b237/relevance/1>). The observations and interpretations have been provided below:

5.1 Yearly Research Productivity

Table 1: Year-wise Research Productivity of IITM during 2016-2020

S. No.	Year	Articles Extracted from WoS	Citations (as per WoS)	Citations Per Item (as per WoS)	IITM Paper in IITM-IR	CIF (Cumulative Impact Factor)
1.	2016	147(18.10%)	122	0.824	151	426.211
2.	2017	138(16.99%)	426	3.086	153	499.531
3.	2018	134(16.5%)	950	7.089	159	449.027
4.	2019	204(25.12%)	1959	9.602	206	647.015
5.	2020	189(23.27%)	2673	14.142	186	551.788
Total	2016-2020	812	6130	34.743 (average 6.948)	855	2573.572

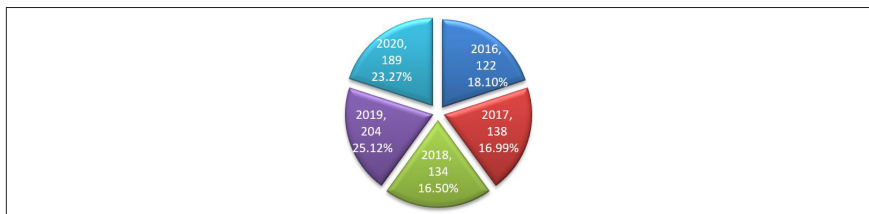


Fig. 1: Distribution of Research Productivity Year-wise

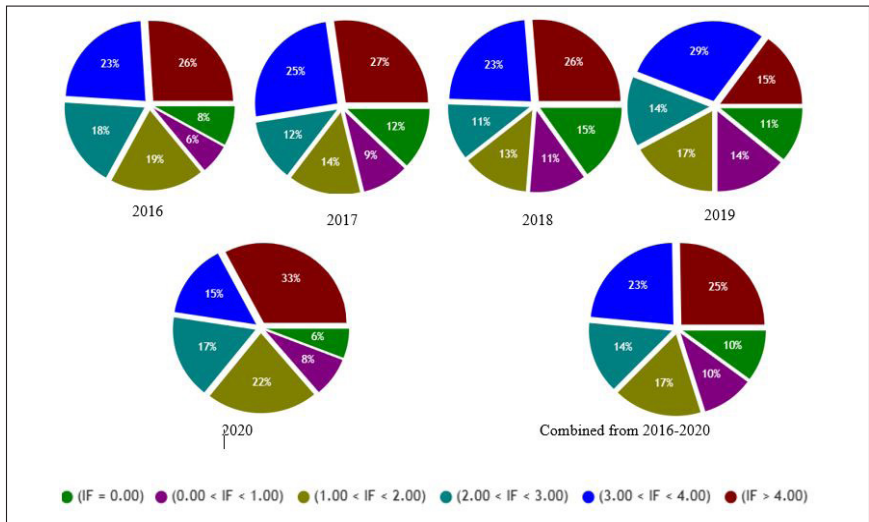


Fig. 2: Showing the Distribution of Publications in IITM-IR during 2016-2020

The research Productivity is shown in Table 1. The authors have considered only peer-reviewed journals. A few differences are found in the total number of publications mentioned under columns B and E for respective years. These differences may be attributed to the consideration of journals by Clavirate Analytics (previously known as Thompson Reuters). On average, IITM has published 162 papers per year and 171 papers per year in journals during the period as per WoS and IITM-IR, respectively.

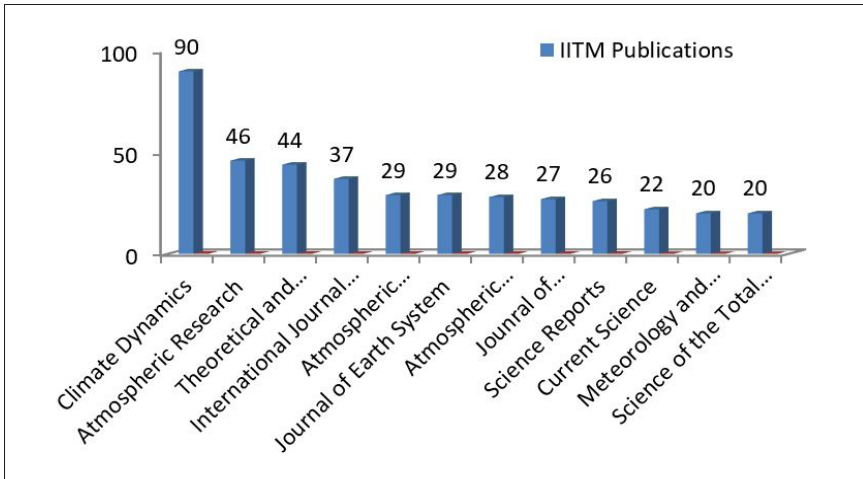
Though the total number of publications varies over the period, an increase in the Cumulative Impact Factor (CIF) trend has been found for IITM research publications. An increase of 29.46% in CIF is observed.

5.2 Research Output to Peer-Reviewed Publication Titles and Publishers

After analyzing the research productivity, it is observed that Climate Dynamics (90 papers or 11.08% of total publications; 2023 IF:) has the highest number of research output published by IITM researchers, followed by Atmospheric Research (46 papers or 5.66% of total publications; 2023 IF:), Theoretical and Applied climatology (44 papers or 5.41% of total publications; 2023 IF:), International Journal of Climatology (37 papers or 4.55% of total publications; 2023 IF:), Atmospheric Environment and Journal of Earth Sciences (29 papers or 3.57% of total publications; 2023 IF:), Atmospheric Chemistry and Physics (28 papers or 3.44% of total publications; 2023 IF:). It is noted that authors of the Institute have selected the titles based on their Impact Factor to publish their research output. The above graph indicates that researchers selected journal titles with more impact factors from 1995 to 2020.

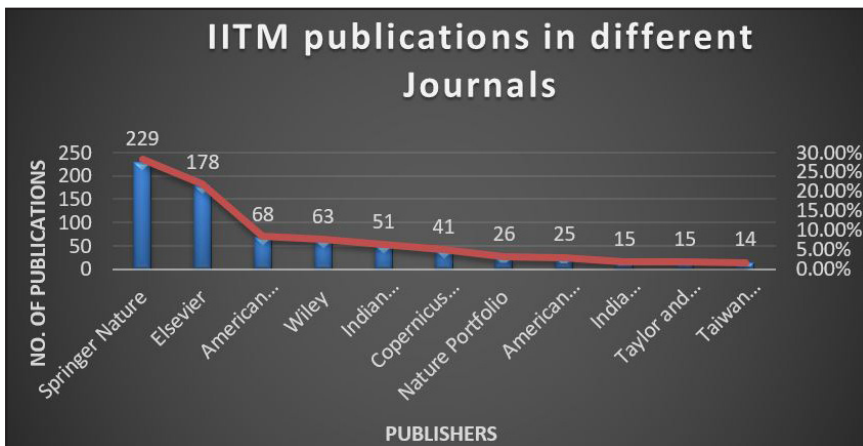
Table 2: Showing the Highest No. of Research Publications Published in Peer-reviewed Journals (*JCR 2024)

S. No.	Period	Highest Number of Research Publications, Published in Peer-reviewed Journals by IITM Researchers	Impact Factor for the Year 2024
1.	1995-2005*	Current Science	1.1
2.	2006-2015*	Journal Of Geophysical Research Atmospheres	3.8
3.	2016-2020	Climate Dynamics	3.8



Graph 1: Showing the IITM Publications in different Publication Titles during 2016-2020

The above observations show the peer-reviewed publication titles; since IITM is a premium institute, its scientists want to publish their outputs in reputed publishers. The result indicates that Springer Nature (publisher of different Journals) is the top-most priority of the researchers to publish their research outputs, with a record count of 229 articles with a share of 28.202% of total publications after Elsevier is the second most chosen publisher with a record count 178 with a share of 21.92%. The graph below will provide us with detailed information.



Graph 2: Showing the IITM Publications in Different Journals during 2016-2020

5.4 Productive Research Areas

The institute works on weather and climate science areas; therefore, the researchers working in these areas have to study different subjects related to weather and climate, such as Atmospheric sciences, Environmental sciences, Chemistry, Physics, Oceanography, etc. The subject-wise distribution has been investigated using the Web of Science data to know the most productive research areas. The total number of IITM publications from 2016 to 2020 is 812. IITM scientists mostly worked in the fields of Meteorology, Atmospheric Sciences (60.71%), Environmental Sciences Ecology (22.29%), Geology (12.31%), Science Technology, Other Topics (11.33%), and other subject areas also. The graph given below gives us a detailed picture of this.

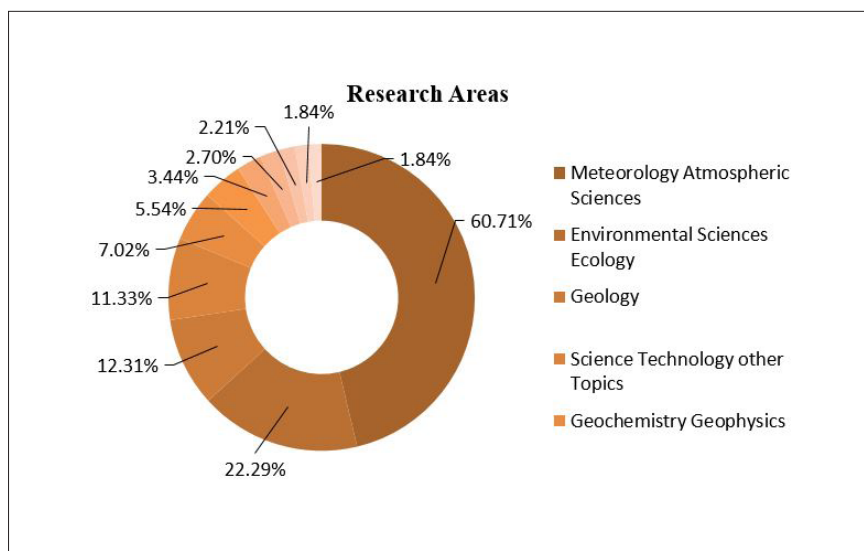


Chart 1: Showing Different Research Areas

5.5 Authorship Pattern

Data was analyzed for authorship pattern to know about the most productive author and found that Tiwari, S. (54 publications) contributed in a large ratio, followed by Pandithurai, G. (42 publications), the present director of the institute Dr. Krishnan, R. (35 publications) has also contributed significantly during the period of study. The former head of the LIP Division, Mukhopadhyay, P., has published 30 publications. The treemap below defines the publication count of scientists working on different institute projects.



Fig. 3: Tree-map showing the Most Productive Authors during 2016-2020

5.6 Affiliations and Collaborations

Being the country's prominent research institute in earth sciences, climate, and weather forecasting, many national, international, private, autonomous, and departments of various institutes at individual levels affiliate and collaborate for research and development purposes. Due to this quality, a qualitative analysis was conducted, and data was extracted from the WoS database using different dropdown options.

5.6.1 Affiliations of the Institute with Other Institutes/ Universities in the Country

Affiliation means being closely associated, and to make India a developed nation by 2047, it is necessary to increase the affiliation and collaboration among the country's institutes. IITM has also been involved by affiliating itself with several institutes within the country. To qualify the degree of affiliation, we have investigated the data of research output of the IITM from the WoS database. We have analyzed results that show that IITM is mainly affiliated with the best institutes in India, with whom it conducts research for the betterment of the country. Data shows that as the IITM, Pune comes under the Ministry of Earth Sciences, whatever IITM publishes is directly affiliated with MoES. Its highest collaboration is with Savitribai Phule Pune University (138 publications), followed by IMD (Indian Meteorological Department) (92 publications), CR (87 publications), and many other premium institutes in India. The treemap below provides a brief picture of the affiliation of IITM, Pune.

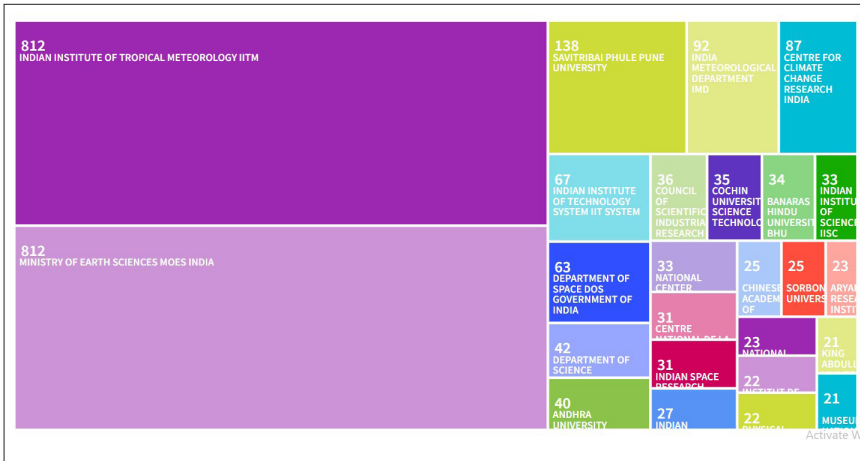


Fig. 4: Tree-map Showing the Affiliation of Institute with Various

5.6.2 Affiliation with Different Departments of the Institutions

Data concerning the absolute and relative production of articles by the affiliation of departments of the institutions such as Andhra University College of Science and Technology has published 37 publications with a share of 4.55%, Andhra University Department of Meteorology and Oceanography (36 publications; 4.33%), Banaras Hindu University Faculty of Science and Department of Physics (15 Publications each; 1.84%), etc. The treemap below shows an overall picture of the affiliated departments of the different institutes.



Fig. 5: Tree Map Showing the Institute's Affiliations with Various Departments

5.6.3 International Collaborations

Collaboration happens when more than one institute of different countries works on the same subject and publishes a paper. Collaboration helps to expand the skyline of ideas, universalization, and generalization of research. From the investigated records extracted from the WoS database, we have depicted the collaborating countries between 2016 and 2020. IITM is one of the foremost research institutes on weather and climate globally. Through the analysis, it was found that the USA (148 publications; 18.22%) was the most significant collaborator among all the other countries, followed by China (44 publications; 5.41%) and Japan (42 publications; 5.17%), etc. The graph below clearly shows the institute's collaboration with different parts of the world.

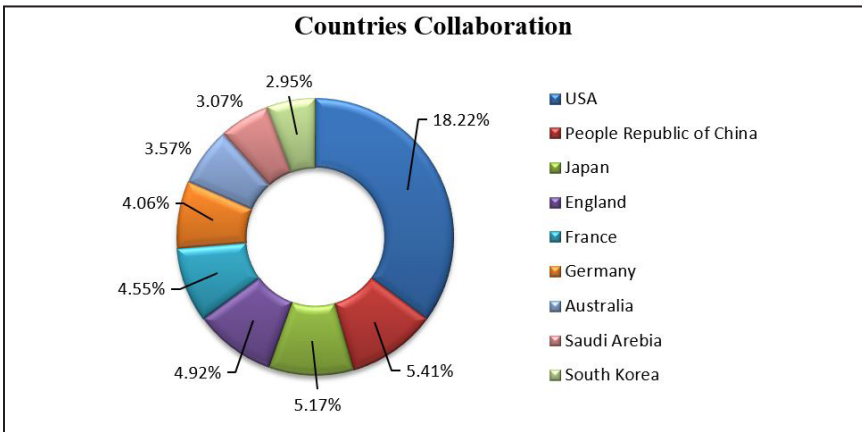
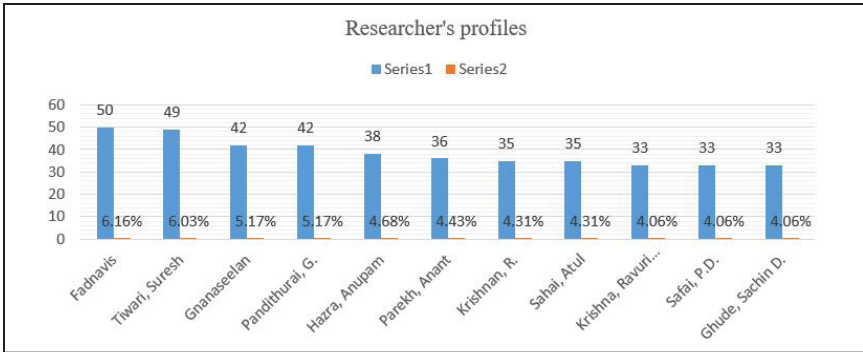


Chart 2: Showing the Distribution of Collaborating Countries

5.7 Researcher's Profiles

During the research, we found that the data comes under the dropdown section named "Researchers Profiles." The researcher's profile data shows that a particular author has contributed to their research in many subjects. After investigation, we concluded that Fadanvis, S. (50 publications) has the highest versatility in her research covering different subject areas in the knowledge universe. She has primarily contributed in the subject area of Environmental Science and Meteorology Atmospheric Sciences (26 publications each), followed by Multidisciplinary Sciences (6 publications). Many of the institutes' scientists were found while investigating. The graph below provides us with more information.



Graph 3: Showing the Researcher's Profile

5.8 Citation Overview

To obtain a citation overview of the IITM publication for 2016-2020, the WoS database has been used by applying some filters. The information retrieved has been presented as a citation report of the institute for the period under study, as shown in the picture below. For this study, "INDIAN INSTITUTE OF TROPICAL METEOROLOGY IITM" as Organization- Enhanced and "2016-2020" as the period have been fixed as observational criteria.

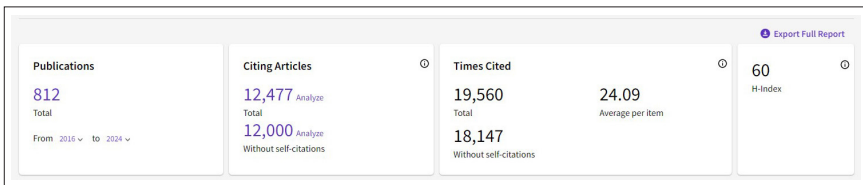
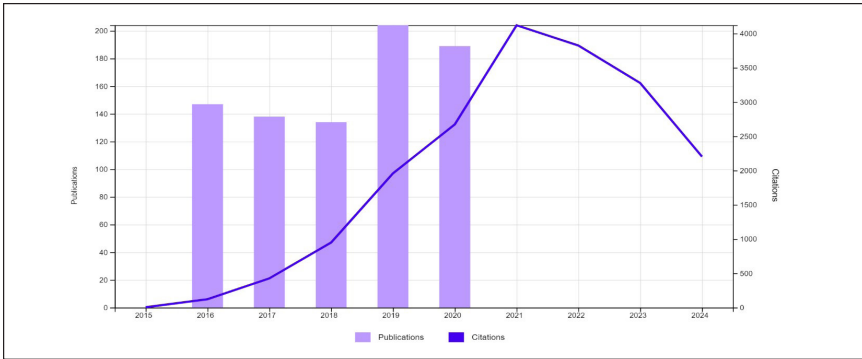


Fig. 6: Citation Overview of IITM during 2016-2020

The Citation report shows that the Institute has produced 812 research publications in five years (2016-2020). **The H-index of the institute and average citation per publication are 60 and 24.09, respectively.** It also provides us with data about how many times the research papers were cited during the study, showing the qualitative value of our institutes' publications. All publications published by IITM are cited 19,560 times, of which 18,147 are without self-citations. From the above citations report, it is also revealed that IITM publications are citing 12,477 research articles, out of which 12,000 are without self-citations. From the above citation report, it is clear that IITM research publications are getting good citations worldwide. Also, other researchers from the same field are using IITM research output for their research work. The graph below represents a better picture of these observations.



Graph 4: Showing the Citations and Publications during 2016-2020

5.9 Some More Outcomes of the Study

During the data investigation, we came across various factors that show the qualitative picture of the institute. The institute is funded by the Ministry of Earth Sciences (137 publications), so most of the funds for research come from it. Other funding agencies, such as NSF, CSIR, NERC, etc., also provide funds to the institute for research. Most of the articles are coming under the open access category (388 publications or 41.62% of the total), which signifies the reach of the institute’s research work on the ground level. The research outputs of the institute reflect its commitment to achieving Sustainable Development Goals in the country. Most of the research was conducted in SDG 13 Climate Action (776 publications), followed by SDG 11 Sustainable Cities and Communities (217 publications). The tree maps below will provide a clear picture of these notes.



Fig. 7: Showing the Different Funding Agencies of the Institute

Table 3: Showing the Fields of Publications

S. No.	Field	Publication Count	Percentage
1.	All Open Access	338	41.66%
2.	Gold	142	17.48%
3.	Gold-Hybrid	36	4.43%
4.	Free to Read	126	15.51%
5.	Green Published	82	10.09%

**Fig. 8:** Showing the Publication Count in the SDGs Category

6. FINDINGS OF THE STUDY

- Researchers of the Indian Institute of Tropical Meteorology, Pune, have published 812 publications from 2016-2020 on different weather and climate topics. Although there is not much variation in the number of papers observed, an increase in the trend for the cumulative impact factor of the published papers has been found. Researchers have selected to produce their research outputs in high-impact factor journals related to their subject area.
- Most of the papers have received good citations from other researchers. The average citation per item is 24.09. The h-index of the institute was found to be 60 during the period considered for the study.
- Meteorology and atmospheric sciences are the core subject areas of the institute, followed by environmental sciences.
- As far as collaborations of IITM are concerned, the institute has produced maximum research output within the institute, followed

by Pune University. The institute has also collaborated with different departments of various institutes across the globe, most of which collaborate with Andhra University's College of Science and Technology, followed by the Department of Meteorology and Oceanography. Regarding international collaboration in the category of countries, the USA generated the highest research output, followed by China.

7. CONCLUSION

The present study investigated the scholarly articles published in peer-reviewed journals from 2016 to 2020 by the researchers of the Indian Institute of Tropical Meteorology (IITM), an autonomous research institute under the Ministry of Earth Sciences. The authors have considered two databases for bibliometric analysis: an in-house developed and maintained institutional repository of IITM and the Web of Science database. The bibliometric details for the period mentioned above were extracted. Citation analysis has been carried out using WoS. This paper's authors have attempted to analyze the research productivity and citation for the Cumulative Impact Factor (29.46% of the increase) for IITM research productivity. The analyzed data reveals that most papers were published in peer-reviewed journals with a high impact factor and received about 12,477 citations (of which 12,000 are without self-citations) during the study period. The average citation per item and H-index of the institute are found to be 24.09 and 60, respectively. Meteorology Atmospheric Sciences, followed by Environment Sciences, are this Institute's top most productive research areas. It was found that IITM collaborates more scientifically with national institutes, viz., mainly with Pune University, followed by the IIT system. The USA and China are the top collaborating countries of IITM.

Libraries are the primary center of formation distribution in any institute. This kind of analysis can help the institutes quantify and qualify their research output. It will help the institute and its researchers improve their research output and increase the competition among them. It also reflects the fifth law of library science: "The Library is a growing organism."

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10

Bridging the Knowledge Gap: Developing Sustainable Models for Information Access in Orphanages

Yogita Ahuja¹

Abstract

This research paper aims to address the knowledge and information disparity faced by children in orphanages. Access to information is a critical factor in educational and personal development, yet children in orphanages often face significant barriers in this regard. This research paper examines the pivotal role of libraries in orphanages, emphasizing how these institutions serve as essential resources for educational support, personal development, and emotional well-being of orphaned children. The study begins by highlighting the unique challenges faced by children in orphanages, such as limited access to educational materials, lack of individualized learning support, and the need for safe, constructive environments for personal growth. The core argument of the research revolves around the transformative impact of libraries within these settings. The study explores how access to a variety of genres and information sources fosters not only academic skills but also encourages a love for reading, critical thinking, and lifelong learning. Moreover, the research paper discusses how libraries act as safe havens for children, offering a space for creativity, exploration, and escape from the challenges of their everyday lives. The role of librarians or caretakers in these libraries is also examined, particularly their contribution to creating a supportive and nurturing environment that encourages children to engage with literature and learning. This study seeks to develop and evaluate sustainable models for enhancing information access in these settings, focusing on the integration of

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library resources and digital technologies. This research study will also try to provide recommendations for policy makers and practitioners for scaling and replicating successful information access model for marginalised.

Keywords: Orphanages, Policy Makers, Sustainable Models, Information Access, Orphaned Children, Orphans, Library

1. INTRODUCTION

According to Oxford Dictionary the word “orphan” which is a noun means a child whose parents are dead and bereaved (a child) of its parents. The word orphan derived from the Greek word “orphanos” which means “bereaved”. In common usage, only a child (or a young animal) who has lost both parents are called an orphan. Some definitions as advanced by researchers are “orphan is someone who lacks support or care or supervision or someone deprived of parents or who’s natural are absent or dead or whose parents are not there to bring him up.”

UNESCO, 2009 also highlighted that, an orphan is defined as “a child under the age of 18 whose mother, father, both parents, and a primary caregiver has died, and who is in need of care or protection”. However, this definition does not apply to most Egyptian orphans, as there are many children who are considered to be orphans although they have one or both parents a live (UNESCO, 2009). As per the Namibian Government definition, 2002: An orphan or vulnerable child (OVC) is a child under the age of 18 whose mother, father, both parents, or a primary caregiver has died, and who is in need of care or protection.

Libraries play a crucial role in fostering intellectual growth, creativity, and emotional well-being, particularly in environments like orphanages, where children often face unique challenges. For children in orphanages, access to books and educational resources opens up worlds of opportunity, providing not only academic knowledge but also the emotional support that literature and learning can offer. Libraries offer a safe, quiet space for reflection and exploration, helping children develop their curiosity, critical thinking, and self-expression. By providing a diverse range of books and learning materials, libraries in orphanages can significantly enhance the educational experiences of these children.

Furthermore, libraries in orphanages serve as a bridge to the outside world. They introduce children to diverse cultures, experiences, and perspectives, expanding their understanding beyond their immediate circumstances. In addition to the cognitive benefits, libraries can also

promote literacy, provide access to important life skills, and foster a love for learning that may positively impact the children's future. By cultivating a space of knowledge and imagination, libraries can become a pivotal part of a child's growth, offering not only education but also hope, inspiration, and a sense of belonging.

Through case studies and surveys conducted in various orphanages with libraries, the research provides empirical evidence on the positive effects these libraries have on children's academic performance, emotional well-being, and social skills. The study also addresses the challenges in establishing and maintaining libraries in orphanages, such as funding, resource allocation, and staff training. The research advocates for the integration of well-resourced libraries in orphanages as a vital step towards ensuring equitable access to education and personal development for orphaned children. It calls for collaborative efforts between governments, non-profit organizations, and educational institutions to support the establishment and sustainability of these essential resources.

2. REVIEW OF LITERATURE

Relevant literature has been reviewed while the study. V.Oyedele *et al* (2016) found that the orphaned students' performance is poor resulting from the challenges they face in their lives. It was also found that the support from the Government and other stakeholders to deal with the challenges facing orphaned students in academic performance is very minimal in relation to the existing number of orphaned students.

Bonsa Shume (2019) indicated that, 1) there were no efforts made by schools, educational stakeholders and the government to eradicate the challenges facing orphaned students and to foster academic performance of orphaned children, 2) No academic and financial support provided to orphaned students in their respective classes, 3) No plan of action for the enhancement of a good school performance to orphaned children and 4) No established strategies to support the orphaned children financially or make close connection with educational stakeholders and Non-Governmental Organizations to support the orphaned children 5) No identified person in school to help, follow and monitor orphaned learners, 6) No remedial actions designed for Orphaned children attending education in orphan homes, 7) No regular meeting with parents to discuss about Orphaned children's related issues, and 8) No mechanisms put in place to ensure an equal and friendly environment for all the children in the school irrespective of their unique characteristics.

It is also notice that Sri Lanka Library Association (2021), has prepared a guide on “Minimum standard for the libraries in orphanages and child protection centres” which is based on the Guidelines for Library Services to children Libraries published by the International Federation of Library Associations (IFLA).

Goswami, Papari (2023) highlighted in his paper entitled “Child Care Institutions and Orphans situation: A study in Kamrup Metropolitan district of Assam” that he found that when a child lost their parents, they suddenly lost guidance or care in their life. As a result, they feel alone and face a number of social and psychological issues. To ensure the future of these helpless and needy children, the government should pay special attention to them, because children are the backbone of our society. Duggal, Ridhima & Wadhawan Pooja (2020) mention in their paper that “Comparison between Orphans and Non orphans on the dimension of Resilience” As per the recent reports, India is currently a home to 20 million orphans and this figure is expected to increase by 2021 (SOS Children’s Villages CA, 2011). It has been found that eastern region, which includes Bihar, Orissa, Jharkhand and West Bengal is most affected and has around 5.2 million orphans. These statistics are quite alarming and indicate that population of orphans is rising in India.

The following recommendations were provided by Mohamed Elattar¹, Naglaa Fathi Asmaa, Alabdl, Mohamed Ali, and Mohammed, Rehab Elsayed (2019 in their research paper entitled “Impact of orphan children’s emotional and behavioural problems and length of institutionalization on their life satisfaction”

- (i) Increase awareness and training care giver about psychological problems of orphan children
- (ii) Providing social support to all children regarding need regardless of their status.
- (iii) Protecting children from violence and building up their resilience.
- (iv) There was a need for cultivating positive emotions to optimize health, well-being and life satisfaction.

4. STATEMENT OF THE PROBLEM

In the contemporary landscape of educational and developmental growth, access to information plays a pivotal role. However, for children residing in orphanages, this fundamental access is often markedly limited, creating a

significant knowledge gap. The problem is multi-dimensional, encompassing a lack of physical resources such as books and computers, inadequate exposure to digital information platforms, and the absence of tailored educational programs that cater to the unique needs of these children.

The disparity in information access for orphanage children not only hampers their academic progress but also impedes their social, emotional, and cognitive development. The existing resources in orphanages frequently fail to align with the contemporary standards of information access observed in mainstream educational environments. This gap widens further with the rapid advancement of digital technologies, which many orphanage children remain alienated from, due to either lack of resources or insufficient guidance on utilization.

Moreover, the absence of structured programs or initiatives aimed at integrating effective information access in orphanages signifies a systemic oversight. This oversight is detrimental to nurturing the intellectual and creative potentials of these children, who are already at a disadvantage due to their socio-economic circumstances.

The problem is exacerbated by a lack of comprehensive research focusing on developing and implementing sustainable models for information access specifically in orphanage settings. While there have been strides in enhancing educational resources in underprivileged contexts, orphanages often remain neglected in these efforts. The unique challenges presented by the orphanage environment – including limited funding, staff training, and infrastructure – require tailored solutions that are both sustainable and adaptable.

Therefore, the primary challenge addressed in “Bridging the Knowledge Gap: Developing Sustainable Models for Information Access in Orphanages” is the critical need to design, test, and implement effective models of information access. These models must not only provide immediate access to diverse and relevant resources but also ensure sustainability through adaptable frameworks, staff training, and policy integration, ultimately contributing to the holistic development of orphanage children.

4. OBJECTIVES OF THE STUDY

- (i) To assess the current state of information access in selected orphanages.

- (ii) To identify the specific information needs, preferences and barriers of orphanage children.
- (iii) To develop sustainable information access models for enhancing information access in orphanages, focusing on library resources and digital technologies.
- (iv) To provide recommendations for policy makers and practitioners for scaling and replicating successful information accessing models.

These main aim of this study is to comprehensively cover the various aspects of developing and implementing sustainable models for information access in orphanages, focusing on the needs, challenges, and potential strategies for success.

5. GOVERNMENT SCHEMES IN INDIA AIM TO SUPPORT ORPHANS

The Government of India had started several schemes, which provides financial assistance, educational support and healthcare facilities to orphans. Their objectives are dependents on the scheme and benefits are also accordingly. Here is a list of some key schemes listed with their objectives and benefits:

Table 1

S. No.	Scheme Name	Objective	Benefits
1.	PM CARES for Children Scheme	Support orphans due to COVID-19	<ul style="list-style-type: none"> • Monthly stipend from age 18 to 23 • ₹10 lakh lump sum at 23 • Free education and healthcare • Health insurance under Ayushman Bharat
2.	Maa Mamata (Orphan's Welfare) Scheme Bill, 2022 Bill Introduced By Shrimati Shanta Chhetri, December 2022.	To provide social security, proper upbringing, and ensure a bright future for orphan children.	Establishes a Central Registry for orphans. <ul style="list-style-type: none"> • Provides access to education, health, and shelter. • Social security for orphans through financial aid.
3.	Integrated Child Protection Scheme (ICPS)	Institutional and non-institutional care for children in need	<ul style="list-style-type: none"> • Orphanages, shelters, foster care • Financial aid to adoptive parents • Rehabilitation services

(Table 1 Contd....)

(...Contd. Table 1)

4.	Balika Samridhi Yojana	Improve status of girl children (including orphans)	<ul style="list-style-type: none"> • Post-birth grant • Annual scholarship for school education
5.	National Social Assistance Programme (NSAP)	Financial support to needy individuals, including orphans	<ul style="list-style-type: none"> • Monthly pension for orphans (varies by state)
6.	Foster Care Scheme	Promote non-institutional care of orphans	<ul style="list-style-type: none"> • Monthly financial support to foster families
7.	Kasturba Gandhi Balika Vidyalaya (KGBV) Scheme	Education for girls from disadvantaged groups, including orphans	<ul style="list-style-type: none"> • Residential schooling for girls • Free education up to upper primary level
8.	Sukanya Samridhi Yojana	Savings scheme for girl children, including orphans	<ul style="list-style-type: none"> • High-interest savings account • Funds for education and marriage
9.	Rajiv Gandhi National Crèche Scheme	Daycare for children of working mothers, including orphans	<ul style="list-style-type: none"> • Daycare facilities for children aged 0-6 • Health check-ups and supplementary nutrition
10.	Mid-Day Meal Scheme	Improve school attendance and health	<ul style="list-style-type: none"> • Free nutritious meals during school hours
11.	Child Adoption Resource Information and Guidance System (CARINGS)	Legal adoption of orphans	<ul style="list-style-type: none"> • Facilitates adoption process through CARA • Transparent and streamlined adoption process
12.	AICTE-Swanath Scholarship Scheme	Orphan, lost parent(s) to COVID, or ward of Armed Forces/ Paramilitary martyrs	₹50,000 per year for degree/ diploma students

(Table 1 Contd....)

(...Contd. Table 1)

13.	Dayanand Bandodkar Scheme (Goa)	Orphan enrolled in first year of degree/ postgraduate courses in Goa	Full fee waiver (including tuition, hostel, and other charges)
14.	Green Passage Scheme (Odisha)	Orphan pursuing higher education in Govt. or non-Govt. institutions	Full exemption from fees like tuition, hostel, exam, and library fees
15.	Annai Teresa Ninaivu Marriage Assistance Scheme	Orphan girl, aged 18 or above at time of marriage	₹25,000 and 1 Sovereign (8gm) gold coin for orphan girls
16.	Snehapoorvam Scheme (Kerala)	To provide financial assistance to orphans who are living in the family, with their relatives, friends, or the support of the community under the Social Welfare Department.	Class/Degree/Course: Amount of Assistance Children below 5 years and Class I to V: ₹300/- per month Class VI to Class X: ₹500/- per month Class XI and Class XII: ₹750/- per month Degree Courses / Professional Degree: ₹1000/- per month

The above table summarizes the key government schemes that support orphans in India.

5. ANALYSIS OF THE STUDY

- Most of the orphans and orphanages not know about government schemes which are run by governments for their betterment.
- Many orphanages may lack the financial resources to establish and maintain a library with a diverse and updated collection of books and other materials. This financial constraint limits the variety and quantity of resources available to the children.
- The digital divide can be a significant limitation. Orphanages without access to computers, the internet, and digital learning tools hinder children's ability to access a wide range of information and develop digital literacy skills.

- Orphanages may not have staff who are trained in library management or in guiding children to utilize library resources effectively. The lack of skilled personnel can limit the library's role in enhancing children's learning and information access.
- Space constraints within orphanages can limit the establishment or expansion of library facilities. A small or inadequate physical space for the library can restrict the number of children who can use the facility at one time.
- Libraries in orphanages might have limited operating hours, restricting when children can access the resources. This can be due to staffing limitations or the orphanage's daily schedule.
- The library's collection might not be adequately tailored to the age range or interests of the children in the orphanage, which can reduce engagement and the effectiveness of the library as a learning resource.
- Libraries may not be effectively integrated into the orphanage's educational programs. Without structured activities like reading programs, storytelling sessions, or guided research projects, the library's potential as an educational tool may not be fully realized.
- Lack of involvement from the local community or external organizations can lead to stagnation in library development, limiting exposure to diverse and updated resources.
- Continuously updating library resources to keep pace with changing educational standards and children's evolving needs can be a challenge, especially without consistent funding or donations.

Understanding these limitations is crucial for addressing the gaps and enhancing the role of libraries in supporting the educational and developmental needs of children in orphanages.

7. CONCLUSION

The study "Bridging the Knowledge Gap: Developing Sustainable Models for Information Access in Orphanages" significantly contributes to understanding and addressing the critical need for information access among children in orphanage settings. Throughout the research, it became evident that while libraries and information resources play a vital role in the educational and personal development of these children, there are substantial gaps and barriers that hinder effective access and utilization.

The development and implementation of various sustainable models, tailored to the unique environments and needs of orphanages, demonstrate promising potential in bridging this knowledge gap. Collaborative efforts involving orphanages, local libraries, educational institutions, and community organizations proved particularly effective. These partnerships not only enhanced resource availability but also brought in diverse expertise and support, crucial for the success of these initiatives.

Training programs for orphanage staff and the integration of digital resources emerged as key components in advancing the effectiveness of library services. Moreover, the study highlighted the importance of adapting these models to fit different contexts, ensuring scalability and broader applicability.

However, challenges such as long-term sustainability, continuous resource updating, and ensuring equal access across various orphanage settings remain. These challenges underscore the need for ongoing support, policy intervention, and community involvement.

In conclusion, this study lays a foundational path towards improving information access in orphanages, but it also opens the door for further research and action. The goal of ensuring that every child, regardless of their living situation, has access to the wealth of knowledge and opportunity that information brings, is both noble and necessary. The journey towards achieving this goal is ongoing, and it requires the collective effort of policymakers, educators, caregivers, and communities.

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11

CORAL: An Electronic Resources Management System, its Usage in Libraries

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Abstract

The management of electronic resources has become increasingly complex and challenging in the digital age. Libraries and institutions are grappling with the acquisition, organization, and maintenance of an expanding array of electronic resources, including e-journals, databases, e-books, and other digital materials. In response to these challenges, the CORAL (Centralized Online Resources Acquisitions and Licensing) system has emerged as an innovative and comprehensive solution for electronic resources management.

This article provides an overview of the CORAL system and its significance in streamlining the workflows and processes associated with electronic resources. The CORAL system offers a centralized platform that enables libraries to efficiently handle the entire lifecycle of electronic resources, from acquisition and licensing to access management and usage statistics. The

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article discusses the key features and functionalities of the CORAL system, including its modular architecture, which allows for flexibility and customization based on specific institutional requirements. It explores the core modules of CORAL, such as the acquisitions module for managing subscription and licensing information. The article also delves into the benefits of implementing the CORAL system, including improved efficiency, enhanced decision-making capabilities, and increased user satisfaction.

Keywords: Management, Libraries, Electronic Resources, Architecture, Decision, CORAL System.

1. INTRODUCTION

Electronic resource management (ERM) refers to the process of acquiring, organizing, and maintaining electronic resources such as databases, e-journals, e-books, and other digital materials in libraries, educational institutions, or any organization that manages digital content. ERM is a critical aspect of modern information management, particularly in the context of the digital age, where electronic resources have become prevalent and essential for research, education, and information dissemination.

The Key components of electronic resource management typically include Acquisition and Licensing, Access Management, Usage Monitoring and Assessment, Renewals and Cancellations, Metadata Management and Electronic Resource Management.

Acquisition and Licensing: This involves the selection and procurement of electronic resources that align with the institution's needs and budget. Licensing agreements are negotiated to define access rights, usage terms, and restrictions.

Access Management: Ensuring authorized access to electronic resources is essential. This may involve IP authentication, username/password access, or other authentication methods, depending on the resource and licensing terms.

Usage Monitoring and Assessment: Tracking and analyzing usage statistics are vital for understanding how resources are utilized, identifying popular content, and making informed decisions about subscription renewals.

Renewals and Cancellations: Managing subscription renewals and making decisions on whether to continue or cancel subscriptions based on usage, budget constraints, and user needs.

Metadata Management: Organizing and maintaining accurate metadata for each electronic resource, including information about content, access URLs, licensing terms, and usage data.

Electronic Resource Management: Electronic resource management (ERM) refers to the process of acquiring, organizing, and maintaining electronic resources such as databases, e-journals, e-books, and other digital materials in libraries, educational institutions, or any organization that manages digital content. ERM is a critical aspect of modern information management, particularly in the context of the digital age, where electronic resources have become prevalent and essential for research, education, and information dissemination.

2. METHODOLOGY

The website of the “CORAL_Electronic resource management system” - <http://coral-erm.org/resources/> has been studied thoroughly in order to understand its features & modules, furthers the institution’s websites which have CORAL already in use, has been studied to understand its usages.

3. ELECTRONIC RESOURCE MANAGEMENT SYSTEMS

In this 21st century as on date several electronic resource management systems (ERMS) available. However, please note that new systems might have emerged since then, and the information might be outdated. Here are some popular ERMS as of my last update:

- (i) **Ex Libris Alma:** Alma is a cloud-based integrated library system that includes electronic resource management capabilities. It provides tools for acquisition, licensing, and management of electronic resources.
- (ii) **OCLC World Share Management Services:** WorldShare Management Services (WMS) is a cloud-based library management system that includes features for managing electronic resources and licenses.
- (iii) **SirsiDynix Symphony:** Symphony is an integrated library system that offers electronic resource management functionalities, including acquisitions, license tracking, and usage statistics.

- (iv) **Koha:** Koha is an open-source integrated library system that has modules for electronic resource management, allowing libraries to handle e-resources effectively.
- (v) **Innovative Interfaces Sierra:** Sierra is a library management system that includes electronic resource management tools for libraries.
- (vi) **Evergreen:** Evergreen is an open-source integrated library system that has been adopted by various libraries worldwide, and it also offers features for managing electronic resources.
- (vii) **GOKb (Global Open Knowledgebase):** GOKb is an open-source community-driven project that focuses on sharing and managing e-resource data, including license information and metadata.

3.1 Role of ERMs in Library

Electronic Resource Management Systems (ERMS) play a crucial role in modern libraries, particularly those with extensive digital collections. These systems are designed to efficiently and effectively manage electronic resources, such as e-books, e-journals, databases, streaming media, and other digital materials. Here are some key roles and benefits of Electronic Resource Management Systems in libraries:

- (i) **Centralized Management:** ERMS provide a centralized platform for librarians to handle all aspects of electronic resources. This includes acquisition, licensing, access management, usage statistics, and renewal workflows. Having a single system to manage these resources streamlines processes and reduces administrative overhead.
- (ii) **Acquisition and Licensing:** ERMS allow librarians to handle the acquisition and licensing of electronic resources from different vendors and publishers. They can compare subscription options, negotiate terms, and ensure compliance with copyright and licensing agreements.
- (iii) **Accessibility and Authentication:** ERMS help manage access to electronic resources by implementing authentication methods such as IP recognition, proxy servers, or Single Sign-On (SSO) for seamless user access.
- (iv) **Usage Statistics and Analysis:** ERMS generate detailed usage statistics for electronic resources, providing valuable insights into

how these resources are utilized. This information helps libraries make data-driven decisions about collection development and resource allocation.

- (v) **Renewal Management:** ERMS help librarians keep track of subscription and license renewal dates, ensuring uninterrupted access to important electronic resources.
- (vi) **Cost Management:** ERMS aid in cost management by tracking expenditures related to electronic resources. This allows libraries to optimize their budgets and allocate funds more effectively.
- (vii) **Link Resolver Integration:** ERMS often integrate with link resolver systems, which help users access the full-text content of articles or other materials, regardless of the database or provider.
- (viii) **Troubleshooting and Support:** ERMS assist librarians in troubleshooting access issues experienced by library users, thereby enhancing user satisfaction and engagement.
- (ix) **Integration with Library Systems:** ERMS can integrate with other library management systems, such as Integrated Library Systems (ILS) or Library Service Platforms (LSP), to provide a comprehensive and unified library management solution.
- (x) **Resource Evaluation:** ERMS facilitate the evaluation of electronic resources by allowing librarians to gather feedback from users, assess resource usage patterns, and determine the relevance and value of subscriptions.
- (xi) **Collaboration and Communication:** ERMS often support communication and collaboration among library staff and stakeholders, enabling seamless coordination and information sharing.

In short, Electronic Resource Management Systems are indispensable tools for libraries to effectively handle their digital collections, streamline workflows, and provide seamless access to valuable electronic resources for their users. These systems contribute significantly to the overall efficiency and functionality of modern libraries in the digital age.

4. WHY CORAL IS RELEVANT AS AN EFFECTIVE ERM SYSTEM

CORAL” is not a widely known or recognized acronym in the context of Enterprise Risk Management (ERM) systems. While analysing and studying the CORAL website several features comes out as the useful ones. Here are those features for which it can be used as an effective one.

Comprehensive Risk Assessment: A robust ERM system helps identify and assess risks across the entire organization, including operational, financial, strategic, and compliance risks. By having a comprehensive understanding of potential risks, a company can proactively take measures to mitigate and address them.

- (i) **Integration and Alignment:** An effective ERM system aligns risk management with the overall business strategy. It integrates risk management into decision-making processes, ensuring that risk considerations are taken into account while pursuing opportunities and managing challenges.
- (ii) **Enhanced Decision Making:** ERM provides decision-makers with a clearer understanding of the risks associated with various options, enabling them to make more informed and balanced decisions that align with the organization's risk appetite.
- (iii) **Resource Allocation:** ERM helps allocate resources more effectively by prioritizing risks based on their potential impact and likelihood. This allows companies to focus their efforts and resources on managing the most critical risks.
- (iv) **Stakeholder Confidence:** A well-implemented ERM system can enhance stakeholders' confidence in the organization's ability to identify and manage risks, which can lead to increased investor trust and improved relationships with customers, suppliers, and other stakeholders.
- (v) **Regulatory Compliance:** Many industries have specific regulatory requirements for risk management. An ERM system ensures that the organization stays compliant with relevant laws and regulations, reducing the risk of penalties and legal issues.
- (vi) **Adaptation to Change:** In a rapidly changing business environment, an ERM system enables organizations to be more resilient by anticipating and responding to emerging risks and opportunities effectively.
- (vii) **Cost Reduction:** By addressing risks proactively, organizations can potentially avoid costly incidents and losses, thus reducing overall risk-related expenses.

While the specific benefits of a system named "CORAL" are unknown to me, the relevance of any effective ERM system lies in its ability to create a structured and integrated approach to identify, assess, and manage risks.

It helps organizations become more agile, adaptive, and well-prepared to navigate uncertain and challenging business environments.

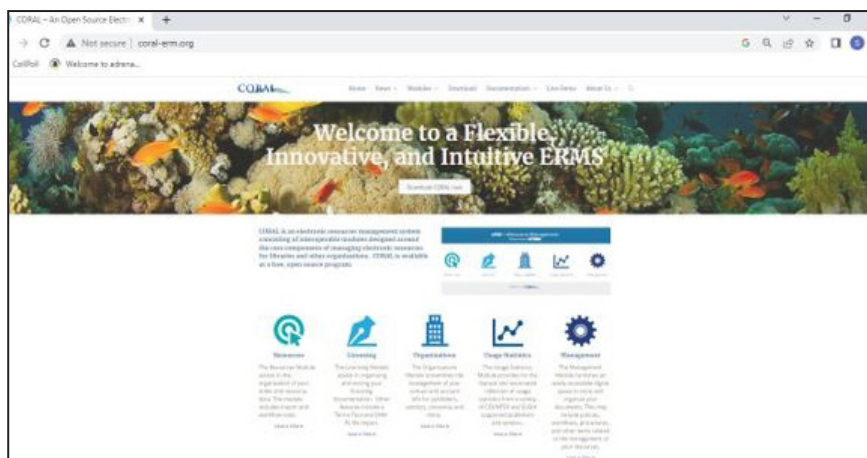


Fig. 1: CORAL Interface

5. FEATURES OF CORAL

As per the website of CORAL, this has several modules and database services on roll. Here are some common features:

- (i) **Acquisition and Ordering:** Manage the acquisition process of electronic resources, including the ability to request, order, and renew subscriptions to databases, journals, e-books, and other electronic content.
- (ii) **License Management:** Store and manage license agreements for electronic resources, ensuring compliance with terms and conditions and tracking license expirations.
- (iii) **Usage Statistics and Analytics:** Track and analyse usage statistics of electronic resources to make informed decisions about renewals and budget allocation.
- (iv) **Authentication and Access Management:** Facilitate user authentication and access to subscribed resources, providing seamless access to authorized users while protecting content from unauthorized access.
- (v) **Resource Discovery and Access:** Integrate electronic resources with discovery systems, library catalogues, and other platforms to improve visibility and accessibility for users.

- (vi) **ERM Integration:** Seamlessly integrate with Electronic Resource Management (ERM) systems to consolidate and streamline workflows related to electronic resources.
- (vii) **Proxy Configuration:** Enable proxy configurations to ensure off-campus access to subscribed resources for remote users.
- (viii) **Resource Usage Alerts:** Set up automated alerts for unusual usage patterns, helping to identify potential subscription abuse or emerging resource needs.
- (ix) **Electronic Resource Troubleshooting:** Assist in diagnosing and resolving access issues for subscribed resources.
- (x) **Vendor and Subscription Management:** Store and manage vendor information, subscription details, and contact information for electronic resources.
- (xi) **Renewal Reminders and Notifications:** Send automated reminders for upcoming subscription renewals to facilitate timely decision-making.
- (xii) **Customizable Reporting:** Generate custom reports to analyse usage, costs, and other metrics relevant to electronic resources management.
- (xiii) **Integrations with Library Systems:** Integrate with other library systems such as Integrated Library Systems (ILS) and Knowledge Bases for efficient workflows.
- (xiv) **Resource Linking and Metadata Management:** Facilitate the linking of electronic resources to appropriate metadata records for accurate discovery.
- (xv) **Remote Access Support:** Ensure support for secure remote access to electronic resources through Virtual Private Networks (VPNs) and other access methods.

It's important to note that the features listed above are general to electronic resource management systems, and the actual features offered by the "CORAL" system, if it exists, might be different. I recommend visiting the official website of the "CORAL" system or reaching out to its developers for the most up-to-date and accurate information.

6. USE OF CORAL ERM IN LIBRARY SERVICES

In the generation Y libraries users are not only interested in the hardcopy books, but they are the seekers of information. In the task of information

- (i) **User Interface:** Some users have found the CORAL interface to be less intuitive and user-friendly compared to other electronic resource management systems. Navigating through the platform may require a learning curve for new users.
- (ii) **Integration with Other Systems:** Integration with other library systems, such as the Integrated Library System (ILS) or discovery layer, may not be as seamless or comprehensive as desired. This could lead to data synchronization issues and extra manual work for library staff.
- (iii) **Limited Customization:** Depending on the version and setup, CORAL may offer limited customization options for individual libraries. This can restrict tailoring the system to match specific workflows and requirements.
- (iv) **Support and Updates:** Some users have reported challenges with customer support and timely updates from the CORAL development team. This could impact the resolution of issues and the implementation of requested features.
- (v) **Performance with Large Datasets:** While CORAL generally handles electronic resources well, performance issues might arise when dealing with very large datasets or if a library has a significant number of electronic resources.
- (vi) **Reporting and Analytics:** The built-in reporting and analytics capabilities might not be as robust as some institutions require. More extensive data analysis and reporting might need to be done outside of the system.
- (vii) **Learning Curve:** Training staff to use CORAL effectively might take time, especially for those who are not familiar with similar resource management systems.
- (viii) **Scalability:** Some users have raised concerns about how well CORAL scales for larger institutions with complex electronic resource management needs.
- (ix) **Dependency on External Resources:** CORAL relies on various external databases and service providers for resource data and functionality. Any issues with these external resources could potentially impact the performance of CORAL.

It's essential to thoroughly evaluate the specific needs of your institution and compare them against the features and limitations of CORAL to

determine if it is the right electronic resource management system for you. Additionally, checking for updates and user experiences beyond my knowledge cut-off date can provide more insights into the current status of CORAL.

8. CONCLUSION

The Libraries of 21st century is not used merely as Library but they are more like cyber space where not only the silent hardcopy books exist but the information flows. As the Librarians our role in judicious filtration of information is very important. Only the Librarians can disseminate the right information to the right users on right time. Here the use Electronic Resource management software plays a pivotal role. Maintaining user database and holding data base is a tedious task, on the other hand to minimize the error and time factor of library service is very serious concern. Though software are used as tools in Library but these tools should come up as the complement for the Library services but not as the support to it.

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Developing Core Leadership Competencies in Library Professionals

Rakesh Kumar Pal¹

Abstract

The present paper describes in detail why leadership qualities must be there in present day library professionals. Now a days, Leadership competencies among library professionals acquire Centre-stage than in any other time in the history of evolution of information sciences given the onslaught of the digital technologies in today's era. It has become all the more essential for the library professionals to acquire key competencies to tackle or satiate the information quest among the all thirsty Gen Z. From navigating the rapid evolution of digital technologies to addressing the changing needs of diverse communities, library leaders must possess a wide range of competencies to guide their institutions effectively. Old school librarianship wouldn't suffice to quell the information zeal among the information seekers. With the change in the medium, scope and information dynamics of information sources/services, the demands of the information explorers has also sea changed.

The core leadership competencies essential for today's library professionals are to be overhauled and updated regularly if they want to remain relevant. The present paper offers an insight into what are these skills and how can they be developed and applied to enhance the effectiveness of library services.

Keywords: Leadership competencies, Leadership in Libraries, Library Professionals.

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1. INTRODUCTION

Leadership in libraries is not just about running a library smoothly, managing human resources emphatically, maintaining a vibrant and exhaustive collection of books and so on. Rather, it involves taking along the society at large and inspiring and guiding the younger vibrant population in particular towards a shared vision. Effective leaders are the ones which are able to adapt to change, revolutionize, and sponsor for the value of libraries in a rapidly shifting information landscape. As libraries increasingly serve as community hubs, centers for lifelong learning, and digital access points, strong leadership is vital to ensuring that libraries continue to meet the needs of their users. Library professionals by virtue of their long cherished wisdom, can revolutionize a society by extending a helping hand to the younger population in identifying their future dreams and carrying out their present responsibilities as well.

2. LEADERSHIP COMPETENCIES

A skill, knowledge, ability which helps to get the desired goal, once applied in proper ways is considered as competency. The Leadership competencies is the fundamental skills and ability to have stimulus and improvement. Leadership competencies may be categorized in two fold i.e. Behaviour Competencies and Professional Competencies. These competencies must be possessing by the library professional during these days.

2.1 Behavioral Competencies

Behavioral competencies are predominantly natural or inbuilt competencies that can be groomed over the time. These include Visionary thinking, Empathetic behavior, Communication Skills, Emotional Intelligence and so on.

2.1.1 Visionary Thinking

No profession can progress unless and until its incumbents lack vision and forward thinking for tackling future challenges and hurdles. The same holds true for the library profession also. If a librarian is not proactive towards future trends and is not able to envision new possibilities and develop strategic plans that align with the library's mission and goals, he/she is bound to lag and will be a burden on the system rather than a facilitator. Visionary thinkers will help their institutions in striding through times of difficulty and dealing with a conundrum better. This competency is crucial for ensuring that libraries remain relevant in the face of technological advancements and evolving user expectations.

2.1.2 Empathetic Behaviour

In every customer oriented service empathetic behavior is indispensable. As libraries attracts patrons who can very easily become demotivated to use the library resources if the library staff displays antagonistic behavior. Due to the emergence of varying sources of information, libraries are already having stiff competition to occupy the narrow space available within the information pursuit. There will always be a fear of losing out unwavering patrons in this technological onslaught if the library staff is ignorant of the empathetic behavior. So it is imperative that the library staff is groomed right from their teaching days to cater to different moods of the patrons. Although such a behavior is an inherent tenet of an individual's character but to some extent it could be groomed up. As a very common saying goes like- "*only the wearer knows where the shoe pinches*"; similarly only a true professional with empathetic feelings could understand the urgency of an information seeker and act accordingly.

2.1.3 Communication Skills

It is difficult to find out a field where communication skills are not needed but such skills are a requisite for a complete library professional. Although communication skills can be honed on but to a larger extent they are an inherent part of the total personality of an individual. Once *Aristotle* wrote that great communicators utilize logos, pathos and ethos to simultaneously appeal to their listeners' logic, emotions and values. In the same way, some professionals have flair to put things in perspective much easily by virtue of their compelling communication skills while others may struggle to simplify things for others. As the efficacy of a library and information system revolves around how clearly and effectively its patron policy is communicated to its users, the whole purpose of such a system gets defeated if it is not properly conversed. So if an information professional wants to make a mark in this arena, he must back his/her communication skills and work on it continuously.

2.1.4 Emotional Intelligence (EI)

Emotional intelligence is the ability to perceive, understand, use, manage and handle one's own emotions as well as the emotions of others. It is key to leading with empathy, resolving conflicts, and creating a supportive work environment. Leaders who possess this competency can build trust, motivate their teams, and navigate the complexities of human dynamics within the library settings. It is an important interpersonal skill especially in the workplace where patrons throng. In order to be successful in a

patron oriented field like librarianship, one must have qualities of self-awareness, self-regulation, empathy and social skills in order to generate an emotional bond with the information seeker(s).

It is an accepted fact that people with high Emotional Intelligence are better adept at avoiding impulsive decision making, better at managing stress, and are able to receive and deliver better feedback, resolving conflict and so on. Like other inherent capabilities, EI is also one of them but can be enhanced by way of paying attention to one's surroundings, yogic methods, attending tailor-made trainings etc.

2.2 Professional Competencies

These competencies could be acquired over the time if right environment is on avail for the library professionals. They include- Innovation and creativity, Hard skills, Computer skills, Information management and Digital Literacy and so on.

2.2.1 Innovation and Creativity

Innovation is crucial for libraries to stay ahead of trends and meet the evolving needs of their users. Leaders who foster a culture of creativity can inspire their teams to explore new approaches, experiment with emerging technologies, and develop programs that engage and empower the community. In order to develop acumen of innovation and creativity, library professionals must be exposed to regular useful training courses, seminars and conferences which could help in preparing state-of-the-art librarians in the country. The Patrons should also give adequate support to librarians by providing funds. Concerns related to librarian's scale promotion and salary must be adequately resolved so that the librarians may get mental peace and work with dedication. This could foster innovation skills among the library professionals. The hallmark of an erudite library professional is the inherent drive to learn and get better.

2.2.2 Hard Skills

A professional librarian learns these skills during the course of his/her study. These include knowledge of library collection development and management, experience in cataloguing, budgeting and accounting, information retrieval, Reference services, Data management, technical skills, preservation techniques, and proficiency in spreadsheets and

database operations. Such hard skills are indispensable in the official journey of a library professional. The knack to classify and catalogue resources is crucial to the success of the professional. These basic skills provide the platform over which the professional builds upon his/her career. These hard skills, combined with strong interpersonal skills and a passion for information and community service, help library professionals excel in their roles.

2.2.3 Soft Skills

The soft skills are a requisite of a library professional. They enhance their ability to interact with users and manage various aspects of the library environment. These include communication, customer service, interpersonal skills, critical thinking, time management, and organizational skills. These soft skills complement the technical and organizational abilities required for library professionals and help ensure a positive and effective library experience for both users and staff.

2.2.4 Computer Skills

In this era when the penchant for digital resources has reached to an unprecedented fervor, it is a bare minimum requirement that a library professional is fully conversant with computers, databases, digital/hybrid dynamics of a library and so on. These include the ability to use specialist computer systems and access materials online and through digital catalogs. Traditional library means have ceased to exist in this 21st century instead they have been reinforced/replaced with various digital paraphernalia like Integrated Library Management Systems (ILMS), Discovery services (like EBSCO Discovery service, OCLC WorldCat Discovery etc.), Electronic Resource Management (e.g. JSTOR, Springer Link), Digital Archives and repositories (e.g. Dspace), Reference management tools (e.g. Zotero, EndNote) and so on.

2.3 Information Management and Digital Literacy

Information management is a crucial aspect of library science and broader organizational operations. It involves the systematic handling of information resources to support the effective organization, retrieval, and use of information. This includes cataloguing, classification, and indexing skills.

Digital literacy includes the ability to train and educate users on how to use Information and Communication Technology (ICT) for facilitating information retrieval by the library users.

3. CONCLUSION

Librarianship is a great profession as it is a selfless service for guiding a user towards the information resources required by him. In this era, when there is bombardment of information from all the longitudes and latitudes, librarians with right leadership qualities can become the guiding force. By virtue of their qualities of identifying spot-on and comprehensive information, library professionals can become the leading light for the information seekers. The library schools should be designed in such a way so that not only they refine the behavioral as well as other professional competencies of library professionals but also exhort the reluctants to understand librarianship like the back of their palm. Only then in true sense librarianship can become a service with a smile.

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Entrepreneurship in Library and Information Science (LIS): An Indian Perspective

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Abstract

This article explores the entrepreneurial potential within the Library and Information Science (LIS) field in India, highlighting the vast opportunities and challenges professionals face. Given the limited job opportunities in the traditional library sector, it emphasises the relevance of entrepreneurial ventures for LIS graduates. The article discusses the National Education Policy (NEP) 2020, which promotes innovation and entrepreneurship, aligning with India's economic reforms and government initiatives to foster entrepreneurial mindsets.

The study identifies existing business opportunities in LIS, including traditional library services, digital content aggregation, patent watch services, library automation, and record management. Peripheral opportunities such as survey data collection, database creation, and information packaging are also explored. Additionally, futuristic business ideas like app-based library services and hybrid models integrating libraries with hospitality services are presented.

The article acknowledges challenges like limited awareness of LIS entrepreneurial potential, a lack of business education, funding issues, and competition from international players. Despite these barriers, it argues that

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LIS professionals can leverage the growing demand for digital transformation, knowledge management, and content curation with the right education, support, and innovation. The article calls for entrepreneurship education in LIS curricula to prepare graduates for a dynamic market.

Keywords: Entrepreneurial Opportunities, Library and Information Science, LIS Business, Future LIS Ventures, Entrepreneurship and NEP 2020, Global LIS Market, India.

1. INTRODUCTION

Entrepreneurship involves the ability to develop, manage, and operate a business enterprise, accepting risks and uncertainties to make ventures profitable. In Library and Information Science (LIS), there is vast potential for entrepreneurial ventures, though this field still needs to be explored. The professional knowledge and skills gained through LIS education equip individuals with entrepreneurial potential, making it possible to build successful enterprises.

In the evolving landscape of libraries, librarians must be trained according to the profession's needs. This includes knowledge of collection development, cataloguing, classification, information dissemination, and advanced computer literacy. Supporting personnel, including those skilled in maintaining digital library systems and equipment, are also critical.

With unemployment being a significant issue in India, many LIS graduates need more job opportunities. Therefore, acquiring entrepreneurial skills has become essential to thrive in this dynamic society. The focus should shift from merely seeking jobs to creating businesses, with LIS professionals tapping into their unique skill sets to carve out new opportunities. While some LIS professionals have already established successful ventures, others are beginning to explore their entrepreneurial potential.

2. ENTREPRENEURSHIP AND NEP 2020

“The National Education Policy (NEP) 2020 emphasizes the importance of innovation and entrepreneurship as key drivers of economic growth, social development, and environmental sustainability. It encourages nurturing creativity and critical thinking among students to foster entrepreneurship, aligning with Sustainable Development Goal 4.4 (SDG), which promotes skills for decent work” (MoE, 2023).

India's economic liberalization 1991 opened the country to global markets, boosting foreign investments and promoting a more entrepreneurial mindset. Through various policies and programs, the government continues to promote entrepreneurship among the youth, aiming to transform the mindset from job-seeking to job creation.

Organizations like the University Grants Commission (UGC), All India Council for Technical Education (AICTE), and Ministry of Skill Development and Entrepreneurship play key roles in embedding entrepreneurship in academic programs. This support has created a conducive environment for entrepreneurial growth across sectors, including LIS.

3. OBJECTIVES OF THE STUDY

This study aims to:

- (i) Identify existing entrepreneurial opportunities in LIS.
- (ii) Highlight futuristic entrepreneurial opportunities in LIS.
- (iii) Explore peripheral entrepreneurial opportunities related to LIS.

4. EXISTING BUSINESS OPPORTUNITIES IN LIS

Entrepreneurship in LIS is gaining traction globally. Research on entrepreneurial opportunities in India (Perumal & Visalatchi, 2020), Nigeria (Abdullahi *et al.*, 2021), Tanzania (Wema, 2021), and Pakistan (Butt & Ahmad, 2022) demonstrates that LIS professionals can build sustainable businesses by offering existing services or creating innovative products to meet the needs of individuals and organizations both domestically and globally. Advances in technology now allow businesses to operate internationally with ease. The following sections highlight existing and future business opportunities for current and aspiring LIS entrepreneurs.

4.1 Traditional Library Services

In metropolitan areas, such as Delhi, businesses providing basic library services to students preparing for competitive exams are flourishing. These libraries offer comfortable reading rooms furnished with essential amenities like lockers and study materials and often operate 24/7, supported by cafés.

4.2 Web-Based Library of Indian Content

India produces vast amounts of information daily through government bodies, academic institutions, and a thriving publishing industry.

LIS professionals can seize the opportunity to create web-based libraries that offer this content globally, supported by technical and translation services.

4.3 Patent and Standards Watch Services

Many private companies need to monitor new patents and standards. LIS professionals can offer subscription-based services to help these companies stay updated on relevant developments.

4.4 Tender Watch Service

LIS professionals can also provide services to companies by scanning business tenders. This expertise is particularly valuable for companies lacking the knowledge to handle such tasks in-house.

4.5 Current Awareness Services

Researchers, professionals like doctors and engineers, and R&D units of private firms often require regular updates on the latest knowledge in their fields. LIS professionals can cater to this demand by curating information from databases and peer-reviewed journals.

4.6 Aggregator Services

Aggregator services, which collect and present publications based on specific subject characteristics, are growing globally. This business remains largely untapped in India, particularly for materials published in vernacular languages.

4.7 Indexing, Abstracting, and Citation Databases

Another business model is providing indexing, abstracting, and citation services to libraries. The Indian Citation Index is an excellent example of this type of venture.

4.8 Library Automation

Automation of libraries using technologies like barcoding and RFID is a well-established business in India. LIS professionals can explore long-term opportunities to maintain automated systems, offer technical support, and manage software upgrades.

4.9 Digitization and Repository Creation

Libraries are digitizing their collections and creating repositories. LIS professionals can bid for these projects and ensure these digital collections' long-term maintenance and expansion.

4.10 Documentation and Record Management

Organizations are moving towards cloud-based storage for essential records, requiring documentation and record management expertise. LIS professionals with the right skills can cater to these needs.

4.11 Running Libraries for Other Organizations

Several organizations, including government agencies, law firms, and private companies, require third-party services to manage and operate their libraries. This opens another avenue for LIS professionals.

5. PERIPHERAL OPPORTUNITIES

5.1 Survey and Data Collection

LIS professionals can establish businesses conducting customer research or market surveys for large companies.

5.2 Publication and Distribution

Entrepreneurship in publishing and distributing books, journals, and electronic resources is another lucrative option for LIS professionals.

5.3 Database Creation

Creating databases for specific fields, such as legal documents or court judgments, offers further business potential. LIS professionals can cater to niche markets by offering specialized databases, especially in regional languages.

5.4 Information Search and Research Services

LIS professionals can offer customized information retrieval services based on the specific needs of their clients, charging based on time and resources.

5.5 Information Packaging/Repackaging Services

Professionals in LIS can package or repackage information into digestible formats for clients, tailoring services based on the complexity and scope of the research required.

Entrepreneurship in LIS is gaining attention in India as professionals explore opportunities beyond traditional library services. The integration of technology, evolving information needs, and the rise of the knowledge economy present challenges and prospects for LIS entrepreneurship.

6. CHALLENGES OF LIS ENTREPRENEURSHIP IN INDIA

The challenges include:

- (i) **Limited Awareness and Scope:** The public's perception of LIS is still traditional, which limits recognition of the field's entrepreneurial potential.
- (ii) **Lack of Entrepreneurial Culture:** LIS education needs to focus on business skills, making it difficult for professionals to transition into entrepreneurship.
- (iii) **Financial Constraints:** LIS entrepreneurs often need help accessing funding since venture capital tends to favour tech-driven sectors.
- (iv) **Technology and Infrastructure Gaps:** Limited technological infrastructure hinders digital library services, especially in rural areas.
- (v) **Market Competition:** Indian LIS entrepreneurs face competition from international players with better resources and established market presence.

7. PROSPECTS OF LIS ENTREPRENEURSHIP IN INDIA

The key opportunities include:

- (i) **Digital Transformation and Smart Libraries:** Capitalizing on the government's push for digitization through smart libraries and AI-based systems.
- (ii) **Knowledge Management Services:** Offering services that help businesses and organizations manage and curate knowledge more effectively.

- (iii) **Information Literacy and Training:** Establishing training programs to improve information literacy in an age of digital overload.
- (iv) **Collaboration with Startups and EdTech:** Partnering with educational technology companies to curate educational content or develop digital learning platforms.
- (v) **Research and Data Analytics Services:** LIS professionals can offer educational institutions and businesses bibliometric analysis and research support.
- (vi) **Self-Publishing and Digital Content Curation:** LIS professionals can enter the self-publishing space, offering services such as content curation, digital rights management, and indexing.

8. FUTURISTIC BUSINESS IDEAS IN LIS

- (i) Customized information search and research services.
- (ii) Home delivery of library services.
- (iii) Hybrid models, such as libraries integrated with restaurants or resorts.
- (iv) Luxury library services in high-end hotels and resorts combine leisure services like spas with library access.
- (v) Library services at airports.
- (vi) App-based Library Services to business information.

While specific business models are not provided for these futuristic opportunities, they allow creative entrepreneurs to develop sustainable and profitable ventures.

9. CONCLUSION

Entrepreneurship in the field of LIS in India is rapidly evolving, presenting vast untapped potential. Government policies, such as the *NEP 2020*, have created a supportive environment for entrepreneurial growth, while technological advancements are unlocking new possibilities for LIS professionals. Some have already succeeded in areas like library automation, digital preservation, and information management, but numerous opportunities still need to be explored, ranging from aggregation services to hybrid business models.

To fully capitalize on these opportunities, LIS professionals must innovate and develop sustainable business ventures that cater to the shifting

demands of national and global markets. At the same time, the path forward is promising, but significant challenges exist, such as gaps in *entrepreneurial education*, limited access to funding, and competition from well-established international players. However, by focusing on emerging fields like digital libraries, knowledge management, and data curation, LIS professionals can carve out a unique space for themselves.

Colleges and universities must actively prepare students to be entrepreneurial, proactive, and adaptable, equipping them with the skills necessary to thrive in today's dynamic economy. Introducing *Entrepreneurship Education (EED)* in all undergraduate and postgraduate programmes across India, focusing on LIS, will be crucial to achieving this vision. Overcoming barriers like financial constraints, market competition, and more awareness within the LIS community will require innovative approaches and a strong connection with India's growing startup ecosystem. The future of LIS entrepreneurship in India holds great promise. With the right support and strategic focus, it can become a thriving field that drives professional growth and societal advancement.

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Impact of Online Resources among the Student and Scholars of Dr. Baba Saheb Bhimrao Ambedkar University, Lucknow

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Abstract

In the rapidly evolving academic environment, online resources have become essential for enhancing research and learning outcomes. This study investigates the impact of online resources on students and scholars at Dr. Baba Saheb Bhimrao Ambedkar University, Lucknow. The research focuses on usage patterns, benefits, challenges, and their correlation with academic performance. A mixed-method approach, including a structured questionnaire and personal interviews, was used to gather data from 200 respondents across various academic levels. The findings reveal that frequent use of online resources, particularly research databases and e-journals, significantly improves academic performance. However, challenges such as technical difficulties, limited access to paid resources, and lack of training persist, affecting the optimal utilization of these tools. Statistical tests, including ANOVA, Chi-Square, and correlation analysis, were employed to test hypotheses related to resource usage and performance. The results highlight a positive correlation between the frequency of resource usage and academic success. Moreover, postgraduate students reported higher satisfaction with online resources compared to undergraduates, suggesting varying academic needs. The study concludes that improving digital infrastructure, expanding resource accessibility, and providing training on effective resource

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use are critical for maximizing the impact of online resources on academic performance.

Keywords: Online resources, academic performance, e-journals, research databases, digital infrastructure, usage patterns, technical challenges, training, higher education, resource accessibility.

1. INTRODUCTION

In today's rapidly evolving digital landscape, the role of online resources has become increasingly critical in shaping the academic environments of universities worldwide. The advent of the internet and the proliferation of digital technologies have brought about a paradigm shift in how students and scholars access, utilize, and contribute to the vast pool of knowledge. No longer confined to traditional libraries and physical books, learners are now equipped with an unprecedented range of electronic resources that offer access to academic journals, e-books, research databases, online courses, and other educational tools. According to Agarwal (2005), the use of research methodology has allowed for a deeper understanding of how students engage with these online tools.

These online resources have become indispensable in the academic journey, providing quick and easy access to up-to-date information, which is particularly crucial in a world where new knowledge is being created at an exponential rate. Dr. Baba Saheb Bhimrao Ambedkar University (BBAU), located in Lucknow, is emblematic of this transformation, where students and scholars increasingly rely on digital platforms to support their research and learning processes. The university, named after the influential social reformer and principal architect of the Indian Constitution, Dr. B.R. Ambedkar, aims to promote education, research, and social justice. In line with its mission, BBAU has embraced the use of online academic resources, recognizing their potential to enhance learning outcomes, promote academic excellence, and facilitate equitable access to information. As discussed by Bansode (2013), the use of electronic journals has significantly impacted research productivity among university students, which is also reflected in the academic culture at BBAU. Students and researchers at BBAU are utilizing a diverse array of online platforms, from e-journals and digital libraries to research databases such as JSTOR, ScienceDirect, and Google Scholar, which offer a treasure trove of peer-reviewed articles, research papers, and books that cover nearly every academic discipline.

2. OBJECTIVES OF THE STUDY

1. To assess the usage of online resources by students and scholars of Dr. Baba Saheb Bhimrao Ambedkar University.
2. To evaluate the benefits and limitations faced by users in accessing online resources.
3. To study the correlation between online resource usage and academic performance.
4. To test the hypothesis using statistical methods such as ANOVA, Chi-Square Test, and correlation analysis.

3. LITERATURE REVIEW

The advent of online resources has dramatically transformed the landscape of academic institutions worldwide, significantly altering how students and scholars access, utilize, and produce knowledge. Various researchers have explored the multifaceted impact of these digital tools, contributing to a growing body of literature that highlights their benefits, challenges, and future potential.

Agarwal (2005) emphasized the importance of research methodology in understanding user behavior, particularly in terms of how students and researchers interact with digital platforms. This methodological focus has helped shape further studies on how users engage with online academic resources, providing a foundational understanding of digital resource utilization. Complementing this, **Bansode (2013)** conducted a study on the use of electronic journals by university students and found that such resources significantly enhance research productivity. According to Bansode, electronic journals provide easy access to a vast array of peer-reviewed articles, enabling students to keep abreast of the latest developments in their fields. The study also highlighted how electronic journals help reduce the cost and time associated with traditional research methods.

Expanding on these concerns, **Francis (2012)** conducted an in-depth evaluation of e-resources usage at Kerala Agricultural University, focusing on the Consortium of e-Resources in Agriculture. He found that although the consortium greatly enhanced access to scholarly materials, many users still lacked the necessary skills to effectively search and utilize these resources. His study emphasized the importance of user education and regular training sessions to help students and faculty make the most of available e-resources.

Similarly, **Kalbande and Ingle (2013)** investigated the use of e-resources by faculty members at various universities, revealing that while the integration of digital tools has improved access to research, there remains a significant gap in faculty members' digital literacy. This finding underscores the need for ongoing professional development to ensure that educators can effectively guide students in using these resources.

In the context of user satisfaction, **Anie (2013)** explored the utilization of e-journals by research scholars at Sree Sankaracharya University, finding that users were generally satisfied with the availability of e-resources, though they expressed concerns about the limited access to certain high-impact journals. This study further highlights the importance of expanding resource accessibility to meet the growing demands of academic institutions.

The consensus emerging from these studies emphasizes the transformative potential of online resources in academia, but also the pressing need for strategic improvements in accessibility, training, and infrastructure. As noted by **Madhusudhan (2008)** and **Shukla and Mishra (2011)**, addressing technical and educational barriers is essential for maximizing the impact of e-resources on student and faculty performance. Furthermore, **Venkadesan et al. (2014)** stressed the importance of strategic planning and policy development in ensuring that e-resource collections are effectively tailored to meet user requirements, providing a robust digital environment for academic growth.

In conclusion, the literature demonstrates a broad consensus on the positive impact of online resources on academic performance, but it also points to persistent challenges that universities must overcome to fully realize their potential. This review lays the foundation for further investigation into how institutions like Dr. Baba Saheb Bhimrao Ambedkar University can optimize the use of e-resources to support academic success.

4. RESEARCH METHODOLOGY

This research employed a mixed-method approach, combining both quantitative and qualitative data collection methods. A structured questionnaire was distributed among students and scholars of Dr. Baba Saheb Bhimrao Ambedkar University. Personal interviews were also conducted with selected individuals to gather in-depth insights. A total of 200 respondents were selected through stratified random sampling,

representing various departments and academic levels. The demographic profile of the respondents is detailed in the tables below, including age, gender, academic program, and frequency of online resource usage.

The study employed statistical tools such as:

- **ANOVA** for comparing the mean differences in resource usage among various academic departments.
- **Chi-Square Test** to examine the association between demographic variables and the usage of online resources.
- **T-test** for analyzing the significant differences between user satisfaction levels and resource accessibility.
- **Correlation analysis** to study the relationship between the frequency of online resource usage and academic performance.

5. DATA ANALYSIS AND DISCUSSION

5.1 Demographic Profile of Respondents

Table 1: Demographic Profile of Respondents

Variable	Category	Frequency	Percentage
Age	18-22	80	40%
	23-26	90	45%
	27-30	30	15%
Gender	Male	110	55%
	Female	90	45%
Academic Level	Undergraduate	100	50%
	Postgraduate	80	40%
	Ph.D.	20	10%
Frequency of Usage	Daily	70	35%
	Weekly	80	40%
	Monthly	50	25%

The demographic analysis of the respondents shows that in terms of age distribution, 40% (80) of the participants were aged 18-22, 45% (90) were in the 23-26 age group, and 15% (30) were aged 27-30. This indicates a majority of the respondents were in the 23-26 age bracket, typically representing postgraduate students. In terms of gender, 55% (110) of the respondents were male, while 45% (90) were female, reflecting a fairly balanced gender ratio. Looking at the academic level, 50% (100) of the respondents were undergraduates, 40% (80) were

postgraduates, and 10% (20) were Ph.D. scholars, showing a strong representation of both undergraduate and postgraduate students. When it comes to the frequency of online resource usage, 35% (70) of respondents reported using online resources daily, 40% (80) used them weekly, and 25% (50) accessed them monthly. This data highlights frequent engagement with online resources, with the majority using them at least weekly, indicating their significance in the academic activities of students across all levels.

5.2 Questionnaire Analysis

Table 2: Frequency of Online Resource Usage

Frequency	Number of Respondents	Percentage
Daily	70	35%
Weekly	80	40%
Monthly	40	20%
Rarely	10	5%

The survey showed that 35% of respondents (70) used online resources daily, while 40% (80) accessed them weekly. A smaller group, 20% (40), reported using them monthly, and only 5% (10) used them rarely. This highlights a significant reliance on online resources among students and scholars, with the majority using them frequently.

Table 3: Types of Online Resources Used

Types of Resources	Number of Respondents	Percentage
E-books	80	40%
E-journals	100	50%
Research databases	110	55%
Educational videos/ webinars	50	25%
Open-source materials	60	30%

When asked about the types of online resources used, 55% of respondents (110) indicated that they accessed research databases, and 50% (100) used e-journals. Additionally, 40% (80) preferred e-books, 30% (60) used open-source materials, and 25% (50) watched educational videos or webinars. This indicates that research databases and e-journals are the most popular resources, followed by e-books.

Table 4: Technical Access Challenges

Faced Challenges	Number of Respondents	Percentage
Yes	60	30%
No	140	70%

Regarding technical challenges, 30% of respondents (60) reported facing issues, mainly related to internet connectivity and limited access to paid resources, while 70% (140) said they did not encounter any major challenges. This suggests that while the majority can access resources without difficulty, a notable portion still struggles with technical barriers.

Table 5: Usage Purpose of Online Resources

Purpose of Use	Number of Respondents	Percentage
Coursework/ Assignments	70	35%
Research	100	50%
General knowledge enhancement	20	10%
Other	10	5%

The primary purpose for using online resources varied, with 50% of respondents (100) using them for research purposes. Another 35% (70) used them for coursework or assignments, 10% (20) for general knowledge enhancement, and 5% (10) for other purposes. Research remains the top reason for accessing these resources, particularly among postgraduate and Ph.D. scholars.

Table 6: Satisfaction Level

Satisfaction Level	Number of Respondents	Percentage
Highly satisfied	70	35%
Satisfied	90	45%
Neutral	20	10%
Dissatisfied	20	10%

In terms of satisfaction, 45% (90) of respondents were satisfied with the online resources, and 35% (70) were highly satisfied. However, 10% (20) were neutral, and 10% (20) were dissatisfied. This indicates a generally positive response to the available resources, though there is room for improvement in terms of access or quality.

Table 7: Training on Online Resources

Received Training	Number of Respondents	Percentage
Yes	80	40%
No	120	60%

A significant 60% of respondents (120) reported not having received any formal training on how to use online academic resources, while 40% (80) had received training. This lack of training could be a contributing factor to the challenges some respondents face in accessing and using resources efficiently.

Table 8: Preferred Mode of Access

Mode of Access	Number of Respondents	Percentage
University library portals	130	65%
Open-access websites	60	30%
Personal subscriptions	10	5%

When asked about their preferred mode of accessing online resources, 65% (130) of respondents said they used university library portals, 30% (60) relied on open-access websites, and only 5% (10) used personal subscriptions. The heavy reliance on institutional portals suggests that universities play a key role in providing access to these resources.

Table 9: Impact on Academic Performance

Perceived Impact	Number of Respondents	Percentage
Yes	160	80%
No	40	20%

The vast majority of respondents, 80% (160), believed that using online resources had a positive impact on their academic performance, while 20% (40) did not feel this impact. This underscores the significant role that access to quality online resources plays in enhancing academic success.

Table 10: Perceived Barriers to Effective Use

Barrier Type	Number of Respondents	Percentage
Lack of time	50	25%
Technical difficulties	60	30%
Poor quality of resources	30	15%
Lack of training	40	20%
Other	20	10%

The most commonly perceived barriers to effective use of online resources included technical difficulties, reported by 30% of respondents (60), and lack of time, mentioned by 25% (50). Additionally, 20% (40) cited a lack of training, 15% (30) mentioned poor quality of resources, and 10% (20) noted other issues. These findings point to both technical and training-related challenges in fully utilizing the available resources.

Table 11: Preferred Online Resources for Research

Online Resource	Number of Respondents	Percentage
Google Scholar	90	45%
JSTOR	50	25%
ScienceDirect	40	20%
Other	20	10%

When it comes to research, 45% of respondents (90) preferred using Google Scholar, 25% (50) used JSTOR, 20% (40) accessed ScienceDirect, and 10% (20) used other platforms. Google Scholar's popularity likely stems from its free access and broad availability of research papers.

Table 12: Availability of Required Resources

Availability	Number of Respondents	Percentage
Yes	140	70%
No	60	30%

In terms of the availability of required resources, 70% (140) of respondents felt that most of the resources they needed were available, but 30% (60) expressed that key resources, especially those behind paywalls, were often unavailable. This highlights a gap in access to essential academic materials for some users.

Table 13: Preferred Devices for Access

Device Type	Number of Respondents	Percentage
Laptop	120	60%
Smartphone	60	30%
Tablet	10	5%
Library computers	10	5%

Most respondents (60%, 120) used laptops to access online resources, while 30% (60) relied on smartphones. Tablets and library computers were each used by 5% (10) of respondents. This suggests that laptops

are the preferred device for academic purposes, with smartphones also playing a significant role.

Table 14: Information on New Resources

Information Source	Number of Respondents	Percentage
University announcements	100	50%
Peers/ Word of mouth	60	30%
Online notifications	40	20%

When asked how they learned about new online resources, 50% of respondents (100) said they received information through university announcements, 30% (60) heard about them from peers or word of mouth, and 20% (40) relied on online notifications. University communications clearly play a key role in informing students about available resources.

Table 15: Usage of Open Access vs. Paid Resources

Resource Type	Number of Respondents	Percentage
Open access	140	70%
Paid subscriptions	60	30%

70% of respondents (140) relied primarily on open-access resources due to financial constraints, while 30% (60) had access to paid subscriptions via the university. This highlights the importance of open-access materials for the majority of students and scholars, especially those with limited access to paid resources.

5.3 Hypothesis Testing

Hypothesis 1

There is no significant difference in the usage of online resources among students from different academic departments.

Table 16: Difference in the Usage of Online Resources among Students from Different Academic Departments- ANOVA Test Results:

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	1.02	2	0.51	4.67	0.01	3.07
Within Groups	18.40	197	0.09			
Total	19.42	199				

Above analysis tested whether there is a significant difference in the usage of online resources among students from different academic departments. An ANOVA test was conducted to examine this, with the results summarized in Table 16. The analysis revealed that the sum of squares between groups (SS) was 1.02, with a mean square (MS) of 0.51, while the within-group sum of squares was 18.40. The F-value was calculated to be 4.67, and the corresponding p-value was 0.01, which is less than the significance threshold of 0.05. Since the p-value is below 0.05, we reject the null hypothesis, concluding that there is a significant difference in the usage of online resources among students from different academic departments. This indicates that the students in various departments engage with online resources at varying levels, possibly due to the differing academic demands or accessibility of resources specific to their fields of study.

Hypothesis 2

There is no significant relationship between the frequency of online resource usage and academic performance.

Table 17: Relationship between the Frequency of Online Resource Usage and Academic Performance-Correlation Analysis

Variable	Correlation Coefficient (r)	P-value
Frequency vs. GPA	0.56	0.003

Above analysis examined whether there is a significant relationship between the frequency of online resource usage and academic performance, measured by the students' GPA. A correlation analysis was performed, as shown in Table 17. The correlation coefficient (r) was found to be 0.56, indicating a moderate positive relationship between the two variables. The corresponding p-value was 0.003, which is significantly less than 0.05. This result leads us to reject the null hypothesis, establishing that there is indeed a significant correlation between the frequency of online resource usage and academic performance. In other words, students who use online resources more frequently tend to have better academic performance, possibly because of better access to relevant academic materials and tools that aid their studies.

Hypothesis 3

There is no significant association between gender and the use of online resources.

Table 18: Association between Gender and the Use of Online Resources-Chi-Square Test

Gender	Use Online Resources	Do Not Use	Total
Male	90	20	110
Female	70	20	90
Total	160	40	200

Table 19: Association between Gender and the Use of Online Resources- Chi-Square Results

Chi-Square Value	Degrees of Freedom	P-value
1.43	1	0.23

Above analysis aimed to determine if there is a significant association between gender and the use of online resources. A chi-square test was conducted, with the results presented in Tables 18 and 19. The data shows that 90 males and 70 females used online resources, while 20 from each gender group did not use them. The chi-square value was calculated to be 1.43, with one degree of freedom. The corresponding p-value was 0.23, which is greater than 0.05. As a result, we fail to reject the null hypothesis, concluding that there is no significant association between gender and the use of online resources. This suggests that gender does not play a significant role in determining whether or not students engage with online resources, and both male and female students use them at similar rates.

Hypothesis 4

There is no significant difference in user satisfaction between undergraduate and postgraduate students.

Table 20: User Satisfaction between Undergraduate and Postgraduate Students: T-Test Results

Group	Mean	SD	T-value	P-value
Undergraduate	3.80	0.45	2.15	0.04
Postgraduate	4.12	0.39		

Above analysis tested whether there is a significant difference in user satisfaction between undergraduate and postgraduate students when using online resources. A t-test was performed, and the results are presented in Table 20. The mean satisfaction score for undergraduates was 3.80 with a standard deviation (SD) of 0.45, while postgraduates had

a higher mean satisfaction score of 4.12 with a standard deviation of 0.39. The t-value was calculated to be 2.15, with a corresponding p-value of 0.04. Since the p-value is less than 0.05, we reject the null hypothesis and conclude that there is a significant difference in satisfaction levels between undergraduate and postgraduate students. Postgraduate students report significantly higher satisfaction with the online resources available, which may be due to their increased reliance on these tools for more in-depth research work and academic requirements at advanced levels of study.

6. DISCUSSION

The findings of this study provide significant insights into the impact of online resources on the academic performance of students and scholars at Dr. Baba Saheb Bhimrao Ambedkar University, Lucknow. The study revealed that online resources play a crucial role in enhancing research, improving academic outcomes, and fostering greater engagement with scholarly materials. However, the results also point to several challenges that need to be addressed in order to maximize the benefits of these resources. This discussion section will explore the key findings, compare them with existing literature, and suggest potential improvements based on both the data collected and relevant studies.

6.1 Usage Patterns of Online Resources

The data shows that students and scholars at BBAU use online resources extensively, with the majority of respondents (75%) accessing these resources either daily or weekly. This frequent usage aligns with the growing trend in academic institutions globally, where digital resources are becoming indispensable for students at all levels of education. As **Bansode (2013)** and **Mittal and Bala (2013)** noted, the adoption of e-resources in universities has significantly improved research capabilities, offering students access to a wider range of current and diverse academic materials. The usage patterns at BBAU reflect this shift, demonstrating that digital platforms are integral to the modern academic experience.

However, despite the high level of engagement, there is variation in the types of resources used. Research databases (55%) and e-journals (50%) emerged as the most popular resources among the respondents. This mirrors findings from **Dongardive (2015)**, who emphasized that e-resources, particularly journals and databases, are critical for academic research. E-books, open-source materials, and educational videos were

also utilized but to a lesser extent. This could indicate that while students recognize the value of various digital tools, the primary focus remains on resources that directly contribute to research and coursework.

6.2 Benefits and Academic Impact

A key finding of the study is the significant positive impact of online resources on academic performance. A correlation analysis revealed a moderate positive relationship ($r = 0.56$) between the frequency of online resource usage and GPA, indicating that students who use these resources more frequently tend to perform better academically. This supports the work of **Dhingra (2013)**, who found that the availability of e-resources enhances academic productivity and research output. The fact that 80% of respondents reported that online resources had a positive impact on their academic performance underscores their importance in supporting learning and research.

This result is consistent with **Francis (2012)**, who highlighted the crucial role of e-resource consortia in expanding access to scholarly materials, thereby enabling students and faculty to perform at a higher academic level. The availability of resources like Google Scholar, JSTOR, and ScienceDirect at BBAU allows students to stay updated with the latest developments in their respective fields, significantly enhancing their ability to engage in high-quality research. Furthermore, the data aligns with **Kalbande and Ingle (2013)**, who noted that faculty members benefit from using e-resources to stay informed and improve their teaching effectiveness, further contributing to the academic environment.

6.3 Challenges in Accessing Online Resources

Despite the clear benefits, the study also highlighted several challenges associated with accessing online resources. Around 30% of respondents reported facing technical difficulties, such as poor internet connectivity and limited access to paid resources. This issue is not unique to BBAU, as **Shukla and Mishra (2011)** and **Madhusudhan (2008)** both reported similar challenges in their studies of Indian academic institutions. Technical barriers, particularly for students in rural or less-developed regions, continue to impede the full utilization of online resources.

In addition to technical issues, a significant proportion of students (60%) reported that they had not received formal training on how to use online academic resources effectively. This lack of training is a critical factor that

limits the potential of digital resources, as noted by **Dhanavandan and Tamizhchelvan (2012)**, who emphasized the need for improved user education and technical support. Without adequate training, students may struggle to navigate complex databases or maximize the resources available to them. Similarly, **Francis (2012)** pointed out that despite the wealth of information available through e-resources, many students are unable to fully utilize them due to a lack of digital literacy.

6.4 Satisfaction and User Experience

The data also revealed differences in user satisfaction based on academic level. Postgraduate students reported higher satisfaction with the available resources (mean = 4.12) compared to undergraduates (mean = 3.80), as indicated by the t-test results. This suggests that postgraduate students, who are likely more engaged in research, are able to derive greater value from these resources. **Anie (2013)** similarly found that research scholars tend to be more satisfied with e-resources than undergraduate students due to the advanced nature of their academic requirements. Postgraduate students typically rely more heavily on academic databases and journals for in-depth research, while undergraduates may not yet fully grasp the importance of these tools or how to use them effectively.

However, the overall satisfaction rates indicate a need for improvement. While 45% of respondents were satisfied and 35% were highly satisfied, 20% remained neutral or dissatisfied, pointing to areas where resource accessibility, content quality, or technical issues could be enhanced. This aligns with **Madhusudhan (2008)**, who stressed that user satisfaction is closely linked to the availability of high-quality content and seamless access. Universities must ensure that their digital infrastructure supports easy and efficient access to the necessary academic materials.

6.5 Policy Implications and Strategic Improvements

The findings of this study highlight several areas for strategic improvement in the implementation and management of online resources at BBAU. As **Venkadesan et al. (2014)** suggested, academic institutions need to adopt a more structured approach to managing e-resource collections. This includes not only providing access to high-quality materials but also ensuring that students and faculty are adequately trained in how to use these resources effectively. Moreover,

addressing technical barriers such as internet connectivity is crucial for equitable access to online resources, particularly in regions where digital infrastructure may be lacking.

One possible solution is to expand the use of e-resource consortia, as recommended by **Chandrasekharan *et al.* (2012)**. By collaborating with other institutions, BBAU could enhance its access to a broader range of academic materials at a reduced cost, benefiting students and scholars across departments. Additionally, investing in workshops and training sessions could bridge the digital literacy gap, enabling students to fully utilize the wealth of resources at their disposal.

6.6 Future Research Directions

While this study provides valuable insights into the impact of online resources at BBAU, further research is needed to explore the long-term effects of digital resource usage on academic success. Longitudinal studies could help track how consistent use of e-resources influences academic performance over time. Additionally, qualitative research, such as focus groups or interviews, could provide a deeper understanding of the specific challenges students face when accessing and using online resources.

7. CONCLUSION

The research concludes that online resources significantly enhance academic performance among students and scholars at Dr. Baba Saheb Bhimrao Ambedkar University, Lucknow. The frequent usage of e-resources, particularly research databases and e-journals, demonstrates their importance in supporting academic work, from coursework to advanced research. A positive correlation between resource usage and academic success underscores their value in improving learning outcomes. However, challenges such as technical issues, limited access to paid resources, and insufficient training hinder optimal use. To fully harness the potential of these digital tools, the university must invest in improving digital infrastructure, expanding resource access, and providing comprehensive training. By addressing these areas, BBAU can enhance the academic experience and equip its students and scholars with the resources they need to succeed in an increasingly digital academic landscape.

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Importance of Licensing in Acquisitions of E-resources

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Abstract

The present paper examines the process of acquiring e-resources and addresses the ongoing challenges faced after acquisition, particularly during access. It highlights how well-structured license agreements can effectively manage these issues by decoding the various clauses they encompass and their implications for libraries. The paper also suggests key parameters that libraries should consider when finalizing agreements with vendors and publishers of online resources.

Keywords: Online Databases, Agreements, Licensing Principles

1. INTRODUCTION: ELECTRONIC DOCUMENTS PROCUREMENT

Electronic documents encompass many resources, including databases, sound recordings, micro-documents, and e-services, all published in digital formats. Producers typically follow three approaches with e-documents:

1. Electronic-only versions of new titles,
2. Digital versions of titles converted from print, and
3. Simultaneous availability of both electronic and print formats.

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These resources are often hosted on local or remote computers, accessible via private networks or the Internet; with many now hosted on cloud servers for real-time, round-the-clock access. The convenience of accessing these resources across multiple devices—such as Kindle, tablets, iPads, smartphones, laptops, and P.C.s—has significantly increased their popularity among readers. Libraries have embraced these technological advancements, recognizing the space-saving and accessibility benefits.

Electronic documents are now integral to most library collections, including various e-services like databases and software that libraries procure directly from publishers. The dominance of electronic formats is likely to grow due to several key advantages:

- **Currency:** E-resources are generally more up-to-date than their print counterparts.
- **Multimedia Access:** They often provide access to all graphics and video material.
- **Accessibility:** E-resources can be accessed at any time and from any location, with flexible search capabilities.
- **Simultaneous Use:** Multiple users can access them concurrently.
- **Space and Efficiency:** E-resources save physical space and reduce the time and effort required to manage library materials.

Despite their many advantages, electronic resources also present some limitations that should be considered before acquisition:

- **Cost:** E-resources are often expensive.
- **Incomplete Content:** Some e-resources may lack certain graphics or charts.
- **Delayed Access:** Many e-resources can lag behind their print versions by a month or more.
- **Technological Challenges:** While many still rely on print due to various technical issues with digital content.
- **License Agreements:** If the library is responsible for long-term preservation, leasing electronic documents can be problematic, even if publishers claim to archive files.

General Procurement Procedure

The procurement process for electronic documents follows a similar path as print materials, with some additional steps. As e-documents necessitate ongoing interaction between:

1. **Service Providers:** Publishers, aggregators, or vendors,
2. **Service Receivers:** Librarians and users, and
3. **Internet/Intranet Providers.**

Pricing

The transition from print to digital has introduced a variety of pricing models and these models can create confusion and budgetary difficulties. Libraries must carefully evaluate these models to ensure they meet institutional objectives while remaining financially viable.

Key Pricing Models

1. **Individual Pricing**
2. **Institutional Pricing Models**
 - (i) **Pay-Per-Use Pricing:** Institutions pay based on usage, which can be ideal for libraries with variable resource needs. The following method may be used for pricing:
 - A set fee for each log-on to the online content
 - A set fee for each search of the online content
 - A set fee for each download of an article/ chapter.
 - A fee per length of online time.
 - A fee per search
 - (ii) **Subscription Models**
 - **Limited Use Pricing Model**
 - **Unlimited Use Pricing Model**
 - **Transaction-Based Pricing Model**

Other Models

Following additional purchase/pricing models may include, but are not limited to:

- **Separate Pricing for Content and Access**
- **Combined Model**
- **Rental Models**
- **Consortia Pricing**
- **Print Plus Electronic**

- **Packaged Pricing**
- **Big Deal**
- **Introductory Pricing**
- **Multi-Year Deals with Fixed Price Caps**
- **Patron-Driven Acquisition (P.D.A.) Models**
- **Initial fees for installation of software and any special hardware and no subsequent fee.**
- **No fee for “looking” and only a fee for downloading/printing and can charge at a variety of rates for either or both.**
- **Fee for “value-added” by aggregators or resellers; different fee for those who do not enhance the content.**

Thus before selecting a pricing model, libraries should analyze their current and projected usage of e-resources. Understanding which resources are most frequently accessed and by whom can guide the choice of the most cost-effective model. Regular review and adaptation of the pricing strategy are crucial to ensuring that the library continues to provide valuable resources to its users in a financially sustainable manner.

Selection

The acquisition process of electronic documents starts with the selection by library staff based on past experience and existing collection development policy and availability of funds. The process also gives due weightage to requests for purchase from concerned library users. After receiving requests from various sources, a consolidated list of all electronic documents is to be prepared and put up by the Library-in-Charge to the LC/LAC for consideration for their subscription/renewal in the format as shown in **Annexure 8**.

The library shall complete all missing details and should consider on following points:

- Economics- prints vs. electronics comparisons
- Ease of use, future accessibility and user support
- Access fee (Subscription or Perpetual, Pick & Choose or Package)
- Licensing, copyright and distribution restriction
- Archival implications
- Single or Multiple Publishers
- For e-Journals- impact factors, index in major databases, open access status, SCImago Journal Rank.

Library-in-Charge should prepare a list of electronic documents and put up to the LC/LAC. The LC/LAC scrutinizes the list and recommends the electronic documents to be subscribed for the next year after consulting subject experts and Library-in-Charge. The signature of the Chairman and Member Secretary of the LC/LAC on each page of the list is mandatory at the time of obtaining approval from the CA.

Licensing Electronic Resources or E-Resources

After finalization of list, it is necessary take necessary steps for Licensing and negotiation before procurement. Please ask from vendors their licensing terms and negotiate with them before placing the orders and entering the licensing agreement. Internet era, introduced numerous challenges for libraries and users regarding the use, access, and distribution of digital resources.

Today, publishing companies invest significantly in training their staff in negotiation skills, especially concerning e-resource licensing. In contrast, many libraries do not focus on developing such skills among their staff. As a result, library professionals often lack negotiation expertise, which is essential for successful licensing (Gruenberg, 2014). Licensing digital content demands various skills, including:

- Understanding licensing terminology and the legal implications of using licensed content.
- Keeping up with rapidly evolving technologies and new ways to access and use content.
- Allocating resources to negotiate licenses and continuously educating oneself on licensing practices.
- Monitoring the electronic usage of licensed content.
- Developing archiving strategies for electronic documents.

While model or standard licenses may appear as convenient solutions to avoid complex negotiations, Since every libraries need are unique, thus adapt the license to your library's specific needs. Using model licenses as checklists is more effective, ensuring that all relevant issues are addressed. Both the American Association of Law Libraries (AALL, 2004) and the International Federation of Library Associations and Institutions (IFLA) have outlined basic principles that should guide agreements between libraries and content providers. The LIBLICENSE Model License Agreement, available at <https://liblicense.crl.edu>, offers valuable guidance to library professionals negotiating licenses with online information providers.

If a license is unavailable, consider requesting a record of the license’s nature. Libraries may also develop standard license templates to present to licensors in such situations. Be cautious of licenses that include hyperlinks to separate documents outlining terms and conditions—these may change without notice. Always insist on a single, comprehensive document for the license. Avoid “piecemeal” agreements, as they may contain contradictory elements and make future administration of the license difficult. Relying solely on oral promises or informal communications for license terms can lead to issues. A clear, complete document will benefit both parties in managing and interpreting the license over time.

Procurement

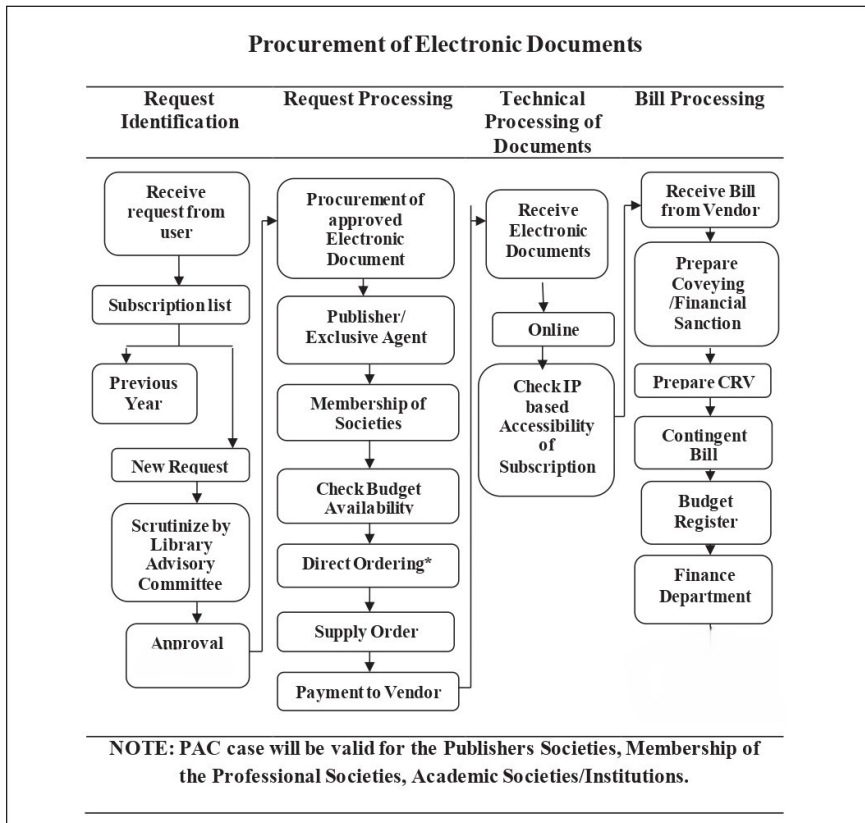


Fig. 1

Two Typical Methods

1. Direct from publishers/producers or exclusive agents/so-called aggregators and
2. Through subscription agent/vendors.

Electronic documents may be procured subject to the financial limits as described in the Schedule of Delegation of Financial Power. While preparing the bills for payment, sanctions shall be prepared for each case (see figure). There may be three mode.

1. **Single Site Single/Multiple Titles from same Publisher**
2. **Single Site Multiple Publishers**
3. **Multiple Site Multiple Subscriptions** (in the case of consortia)

Libraries may subscribe single subscription of each electronic document either from the original sources (publishers) or their exclusive/ authorized agents. Electronic Documents directly from publishers, academic institutions, learned societies, research bodies, and Governments should be treated as proprietary in nature when procurement is made from original sources or through their authorized agents. PAC issued by the publisher is mandatory whenever procurement is made through authorized agents. However, registration of an authorized agent is not mandatory.

Performance Bank Guarantee is not applicable when procurement is made directly from the Indian or foreign publishers or their authorized agents since the publishing industry does not provide BG/FDR as a security deposit. The payment can be made in Rupees to the authorized agents, who represent the publishers. The payments can also be made directly to the foreign publishers in foreign exchange. There is also no constraint in making a deal through a direct payment to the publishers. However, a confirmation of receipt of payment is a very important aspect in this, as it ascertains that the payment has reached the publisher and supply will commence subsequently.

2. DECODING THE LICENCING

Licensing clauses are critical components of agreements between libraries and vendors or publishers for the access and use of electronic resources (e-resources). The clause discussed in this chapter are tried to best set out in a logical order, but you may find a different order in your license.

Below is a guide to understanding key licensing terms and their implications for libraries:

1. Preamble
2. Parties to the agreement
3. Definitions
4. Content covered by the Agreement
5. Rights Granted/License
6. Sublicenses
7. Interlibrary loan
8. Fair Use/Fair Dealing
9. E-Rights
10. Usage or Authorized Users
11. Usage Restrictions
12. License Fee/payment
13. Licensor Obligations
14. Delivery and Continuing Access to the Licensing Content
15. Support and Documentation
16. Library/Licensee Obligations
17. Monitoring Use
18. Moral Rights
19. Credits
20. Territory
21. Authorised User
22. Authorised Site
23. Copyright Ownership
24. Duration of Grant of Rights (Term of Agreement)
25. Renewal
26. Termination
27. Archiving and Perpetual Access
28. Disclaimers
29. Transferability or Assignment
30. Warranties
31. Indemnity and Limitation of liability
32. Governing Laws and General Provisions/Resolution of disputes
33. Force Majeure

1. **Preamble:** The preamble introduces the license agreement but is optional. If included, it should briefly outline the purpose of the agreement.
2. **Parties to the Agreement:** Identifies the licensor (publisher/owner) and licensee (library/organization). Clear language should be used, avoiding legal jargon. Both parties must be properly identified with legal name, address, and contact details. Ensure the individual signing has legal authority and obtain written confirmation if necessary.
3. **Definitions:** Definitions clarify terms used differently from their standard meanings. They can be listed at the beginning or within an appendix. Ensure headings do not affect the interpretation of the agreement.
4. **Content Covered by the Agreement:** This section details the licensed content, including titles, types, ISBN/ISSN, and prices. Be comprehensive in describing all content elements like full-text articles, indexes, or online services. Including this information prevents misunderstandings if content becomes unavailable.
5. **Rights Granted/License:** Specifies how the library and users can use the licensed content. Rights include viewing, downloading, printing, or sharing within closed networks. Clearly define usage rights and clarify if they are non-exclusive or exclusive, as well as any restrictions or additional permissions.
6. **Sublicenses:** Sublicenses allow libraries to grant permissions to third parties, like patrons or authorized users, who are not part of the original agreement. It's important to ensure that the license explicitly covers sublicenses, even if the licensor doesn't mention them. These should be addressed in the "Rights Granted" or "Authorized Users" clauses, or both.
7. **Interlibrary Loan (ILL):** DRM systems may allow lending e-resources like print materials. The license should specify whether and how e-resources can be shared among libraries. Some publishers may resist ILL for digital content due to concerns over rapid distribution, but this can be negotiated by comparing it to the potential for scanned print articles to be shared.
8. **Fair Use/Fair Dealing:** Negotiate fair use/fair dealing provisions that meet the library's needs. Remember, third parties not bound by the license can apply copyright law (fair use/fair dealing). It's important to differentiate between rights granted in the license and broader legal principles like fair use.

9. **E-Rights:** E-rights cover electronic content, including eBooks, eJournals, and online platforms. The definition of e-rights evolves with technology, so the term must be clearly defined in the license, ensuring all forms of electronic content are covered.
10. **Usage or Authorized Users:** This section defines permitted uses, typically including non-commercial, scholarly, educational, or research purposes. Usage terms like “non-commercial” or “commercial gains” should be clearly defined to avoid confusion. Ensure all necessary terms are articulated to prevent misinterpretation.
11. **Usage Restrictions:** This clause details prohibited activities for the library or authorized users, such as sharing content with unauthorized users. Avoid restrictions that hinder the library’s intended use. Reject clauses restricting transparency, especially concerning pricing. Instead, include a clause allowing the library to recover price differences if better discounts are found for similar libraries.
12. **License Fee/Payment:** There is no standard formula for license fees. Libraries should choose payment methods that suit their budget, possibly negotiating payments in local currency. This should be mutually agreed upon between the content owner and the library.
13. **Licensor Obligations:** Specifies the licensor’s responsibilities, including:
 - Honoring license terms if content is sold to another publisher.
 - Ensuring access to originally licensed content, even after ownership changes.
 - Provisions for backup copies or escrow agreements for content preservation.
 - Backup plans for downtime, with limits (e.g., no more than 2%) and advance notice of maintenance.
 - Technical support details, including response times.
 - Frequency of content updates and timely delivery to match print versions.
 - Monetary penalties for service interruptions.
14. **Delivery and Continuing Access to Licensed Content:** The license should clarify the delivery schedule for both print and electronic formats. Ensure timely delivery, with penalties or remedies for delays. Include provisions for refunds if content becomes unavailable during the agreement.

- 15. Support and Documentation:** Ensure adequate support during and after the subscription period, especially for perpetual or post-embargo content. Negotiate support options such as toll-free phone, real-time online, or email support, with clear response times.
- 16. Library/Licensee Obligations:** Libraries should ensure obligations regarding content use by sub licensees and end-users are reasonable. Copyright laws vary by country, so negotiate which country's laws will govern the license. Avoid being responsible for policing users, but educate staff on proper usage. Safeguards include:
 - Ensuring each reproduced article includes copyright details.
 - Displaying copyright warnings for end-users.
 - Making copyright law and license agreements accessible.
 - Ensuring staff awareness of license terms.
- 17. Monitoring Use:** Be cautious about agreeing to monitor content usage. Ensure necessary safeguards are in place if monitoring or security requirements are included in the license.
- 18. Moral Rights:** For global content like illustrations or photographs, licensors may include clauses to protect against modification. Negotiate waivers of moral rights where permissible, avoiding the need to specify individual countries.
- 19. Credits:** Licensors often require credits (name, copyright symbol, publication year) on content. Ensure credits are displayed without interfering with content usability.
- 20. Territory:** Defines the geographic scope for licensed content use. Narrowing the geographic scope can lower fees, especially for worldwide rights. Internet enforcement of territorial restrictions is challenging, except for standalone products.
- 21. Authorized Users:** Define "authorized users" broadly to avoid needing additional permissions. Include library staff, outsourced/contractual staff, affiliated researchers, students, interns, and the general public. This can also include guest users, visiting faculty, and walk-ins.
- 22. Authorized Site:** Ensure offsite access for users is explicitly allowed in the license to avoid issues with remote access, especially for patrons traveling or accessing content from outside the country.
- 23. Copyright Ownership:** Verify that the licensor holds the copyright for the licensed content. The license must clearly state who owns the copyright for both electronic and print content.

24. **Duration of Grant of Rights (Term of Agreement):** The term refers to the license's duration, typically one to three years. Ensure termination clauses protect against unreasonable post-termination obligations and include automatic renewal clauses with conditions like price review and notice periods.
25. **Renewal:** For automatic renewals, ensure both parties agree to opt-in and review conditions like fee increases. Include a clause for advance notice before renewal to address pricing and agreement terms.
26. **Termination:** The license should allow termination only for material breaches and protect the library if content changes. The publisher should offer alternatives or refunds for early termination, with no unreasonable content return demands.
27. **Archiving and Perpetual Access:** Ensure the license includes provisions for perpetual access and archiving, especially for canceled or removed content. Clarify the terms of archival access and the potential costs of maintaining backups.
28. **Disclaimers:** Avoid overly limiting disclaimers by the publisher. Ensure the publisher's liability and warranties do not leave the library unprotected, particularly regarding the content's accuracy, completeness, or fitness for use.
29. **Transferability or Assignment:** If the library merges or the content owner is acquired, ensure the license allows transfer to a new entity. If automatic transfer isn't included, the new party should provide written assurance to honor the original agreement.
30. **Warranties:** Ensure the licensor warrants they have the legal right to license the content and that it doesn't infringe third-party rights. Any breach of this warranty should lead to penalties or indemnities.
31. **Indemnity and Limitation of Liability:** The indemnity clause compensates for any breach of warranties. Ensure the indemnity covers damages, legal expenses, and claims, but assess the licensor's financial stability to rely on this clause.
32. **Governing Laws and Dispute Resolution:** Disputes should ideally be resolved through negotiation. If unresolved, the Arbitration and Conciliation Act, 1996 applies, with arbitration in the licensee's city. Ensure the governing laws and litigation venue are acceptable to your institution.
33. **Force Majeure:** Ensure this clause doesn't unreasonably cover technical difficulties affecting content access, such as power outages or software bugs. Consult technical experts when reviewing.

Thumb Rules for Negotiation

1. No license is non-negotiable.
2. Understand and document your organization's needs and goals.
3. Designate a single negotiator to lead the process.
4. Ensure you negotiate with decision-makers.
5. Ask clarifying questions; don't assume anything.
6. Listen actively, take notes, and review them often.
7. Stay focused on your needs and know when to pause or walk away.

3. CONCLUSION

The procurement and licensing of electronic resources (e-resources) is a vital aspect of library management, offering significant benefits such as enhanced accessibility, up-to-date content, and multimedia capabilities. However, the acquisition and management of e-resources come with challenges, including high costs, access restrictions, and technical difficulties. Pricing models for e-resources differ, and libraries must carefully choose the most cost-effective model based on usage patterns and financial constraints.

Effective licensing is key to ensuring legal compliance and the optimal use of these resources. The process involves negotiating terms with publishers or vendors to establish usage rights and other critical conditions. It's important to strike a balance that accommodates the interests of both publishers and libraries. Libraries should ensure that licensing agreements reflect their specific needs, including provisions for archiving and user access. Ideally, these agreements should be vetted by legal experts or intellectual property (IPR) specialists from the parent organization before finalizing. In cases where this isn't possible, model license agreements can be used as checklists to ensure that all relevant issues are addressed.

The success of e-resource acquisition and management hinges on a thorough understanding of licensing terms, skilled negotiation, and ongoing assessment of usage and pricing strategies. This approach allows libraries to offer valuable resources to users while maintaining financial sustainability. Efforts should also be made by library associations to develop a national model license that is legally vetted by the Ministry of Education and the Ministry of Law and Justice to suit Indian libraries.

Additionally, libraries should ensure that users are well-informed about the legal aspects of using licensed content. Regular educational sessions should be held to educate students and faculty about copyright laws, proper usage of licensed materials, and the consequences of non-compliance.

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Latest Trends and Techniques in Library Science

Raj Kumar Raja¹ and Badal Kumar Thakur²

Abstract

This paper explores the cutting-edge trends and techniques shaping the field of Library Science in the digital age. It examines the impact of technological advancements, changing user expectations and evolving information landscapes on library services and operations. Key areas of focus include digital libraries, data management, artificial intelligence applications, user experience design, and the evolving role of librarians as information professionals. Through a comprehensive review of current literature and case studies, this paper provides insights into the transformative practices that are redefining the future of libraries and information services.

Keywords: Library Science, Digital libraries, data management, artificial intelligence applications, user experience design.

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1. INTRODUCTION

Libraries have long stood as bastions of knowledge, serving as the primary gateway for information access and preservation throughout human history. These venerable institutions have weathered countless societal changes, adapting their roles and services to meet the evolving needs of their patrons. However, the dawn of the 21st century has ushered in an era of unprecedented technological advancement, fundamentally altering the landscape of information creation, dissemination, and consumption. This seismic shift has catalyzed a profound transformation within the field of Library Science, challenging traditional paradigms and necessitating a reimagining of library services, operations, and the very essence of what it means to be an information professional.

The digital revolution has irrevocably changed the way individuals interact with information. The ubiquity of internet-connected devices, the proliferation of digital content, and the rise of social media have created an information ecosystem that is vastly different from that of previous generations. In this new paradigm, libraries find themselves at a critical juncture, tasked with bridging the gap between their historical role as custodians of knowledge and the dynamic, often chaotic nature of the modern information landscape.

No longer confined to the physical boundaries of their buildings, libraries have expanded into virtual realms, offering services that transcend geographical limitations. This expansion has given rise to digital libraries, online databases, and remote access services, allowing patrons to engage with library resources from anywhere in the world, at any time. The concept of the library as a physical space has been augmented by its digital presence, creating hybrid institutions that cater to diverse user needs and preferences.

This transformation has necessitated a radical shift in the skills, methodologies, and technologies employed within the library profession. Information professionals now find themselves navigating a complex web of digital tools, data management systems, and emerging technologies such as artificial intelligence and machine learning. The traditional roles of librarians as catalogers and reference specialists have evolved to encompass data curation, digital preservation, information literacy instruction, and technology implementation.

Moreover, the changing expectations of library users have driven innovations in service delivery and user experience design. Today's information consumers demand seamless, intuitive access to resources,

personalized recommendations, and interactive learning experiences. Libraries are responding by adopting user-centered design principles, implementing discovery systems, and leveraging data analytics to enhance their services and collections.

This paper aims to provide a comprehensive overview of the latest trends, techniques, and innovations that are reshaping the field of Library Science. By examining the multifaceted impact of technology on library services, operations, and professional practices, we seek to illuminate the challenges and opportunities facing modern libraries. From the integration of artificial intelligence in collection development to the use of virtual reality in information literacy instruction, we will explore the cutting-edge developments that are defining the future of libraries.

Furthermore, this study will delve into the evolving role of information professionals in this new landscape. We will investigate how library education and professional development are adapting to equip librarians with the skills needed to thrive in a digital-first environment. Additionally, we will explore the ethical considerations and societal implications of these technological advancements, including issues of privacy, digital divide, and the democratization of information.

As we embark on this exploration of the modern library landscape, it becomes clear that while the core mission of libraries – to provide access to information and foster knowledge creation – remains unchanged, the methods and means by which this mission is accomplished are undergoing a radical transformation. This paper seeks to chart the course of this transformation, offering insights into how libraries are not just surviving but thriving in the digital age, continually reinventing themselves to remain relevant and indispensable in our information-driven society.

This paper will explore several key areas where innovation is driving change in Library Science:

1. Digital Libraries and Archives
2. Data Management and Curation
3. Artificial Intelligence and Machine Learning Applications
4. User Experience and Service Design
5. Information Literacy and Digital Competencies
6. Open Access and Scholarly Communication
7. Emerging Technologies in Library Operations

Through an examination of these topics, we will uncover the challenges and opportunities facing modern libraries and the strategies being employed to meet the evolving needs of users in the 21st century.

2. DIGITAL LIBRARIES AND ARCHIVES

The concept of digital libraries has revolutionized the way information is stored, accessed, and preserved. This section explores the latest developments in digital library technologies and their impact on information services.

2.1 Advancements in Digital Preservation

Digital preservation is crucial for ensuring long-term access to digital content. Recent advancements include:

- Distributed digital preservation networks
- Blockchain technology for authenticity and integrity verification
- AI-powered content analysis for metadata generation

2.2 Enhanced Discovery and Access

Improving discoverability and accessibility of digital collections remains a key focus. Innovations in this area include:

- Semantic web technologies for linked data
- Natural language processing for improved search capabilities
- Virtual and augmented reality interfaces for digital collections

2.3 Collaborative Digital Libraries

Inter-institutional collaboration is expanding the scope and reach of digital libraries. Examples include:

- International Digital Library of the Silk Road
- Digital Public Library of America (DPLA)
- Europeana

Figure 1 illustrates the growth of digital library collections over the past decade:

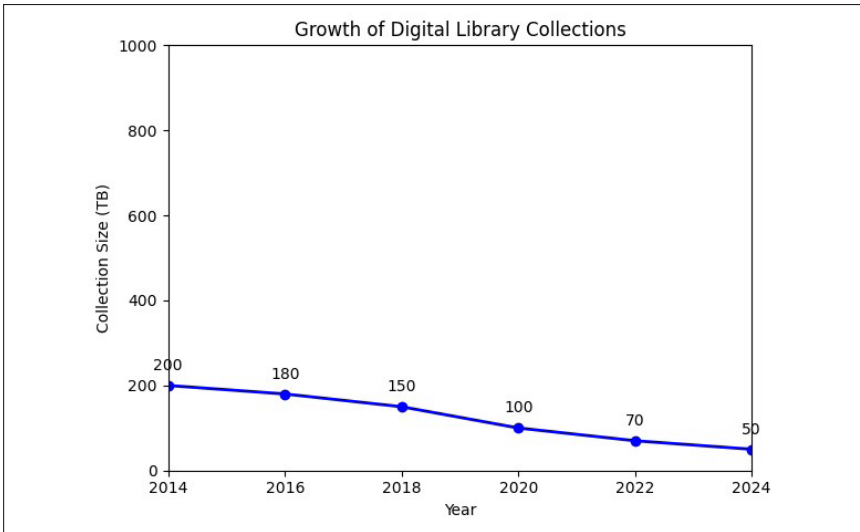


Fig. 1: Growth of Digital Library Collections (2014-2024)

3. DATA MANAGEMENT AND CURATION

As the volume of digital data continues to grow exponentially, libraries are taking on new roles in data management and curation.

3.1 Research Data Management

Libraries are increasingly involved in managing research data throughout its lifecycle. Key trends include:

- Development of institutional data repositories
- Data management plan (DMP) consultations and tools
- Integration of data sets with traditional library catalogs

3.2 Big Data and Analytics

Libraries are leveraging big data technologies to improve services and decision-making:

- Predictive analytics for collection development
- User behavior analysis for service optimization
- Bibliometric and altmetric analysis for research impact assessment

3.3 Data Literacy Programs

Librarians are developing data literacy programs to support researchers and students:

- Workshops on data visualization tools
- Training on data cleaning and preparation techniques
- Guidance on data citation and sharing practices

Table 1 presents an overview of data management services offered by academic libraries:

Table 1: Data Management Services in Academic Libraries (2024)

Service	Percentage of Libraries Offering
Data Management Plan Support	85%
Data Repository	72%
Data Visualization Support	63%
Data Cleaning Workshops	58%
Big Data Analytics Consulting	45%

4. ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING APPLICATIONS

Artificial Intelligence (AI) and Machine Learning (ML) are transforming library operations and services in numerous ways.

4.1 Intelligent Information Retrieval

AI-powered systems are enhancing information retrieval processes:

- Contextual search algorithms
- Personalized recommendation systems
- Automatic classification and tagging of resources

4.2 Chatbots and Virtual Assistants

Libraries are implementing AI-driven chatbots to provide 24/7 reference services:

- Natural language processing for query understanding
- Integration with knowledge bases for accurate responses
- Multilingual support for diverse user populations

4.3 Predictive Collection Management

ML algorithms are being used to optimize collection management:

- Demand-driven acquisition based on user behavior analysis
- Predictive maintenance for preservation of physical materials
- Automated content summarization and abstracting

Figure 2 shows the adoption rates of various AI technologies in libraries:

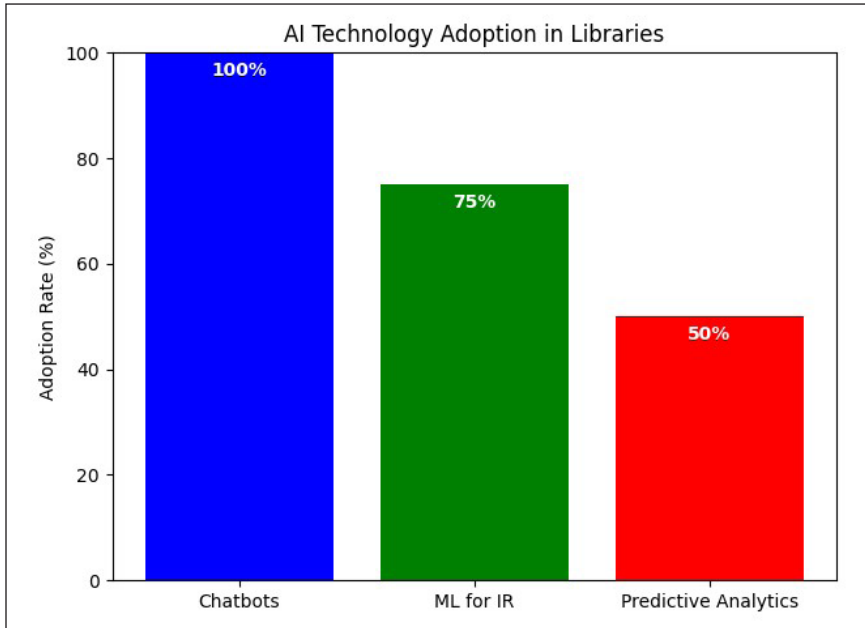


Fig. 2: AI Technology Adoption in Libraries (2024)

5. USER EXPERIENCE AND SERVICE DESIGN

Enhancing user experience (UX) has become a central focus for libraries seeking to remain relevant and valuable to their communities.

5.1 User-Centered Design Principles

Libraries are adopting user-centered design methodologies:

- Ethnographic studies of user behavior and needs
- Iterative prototyping and usability testing of library interfaces
- Participatory design workshops with community members

5.2 Personalization and Customization

Tailoring services to individual user needs is increasingly important:

- Personalized dashboards for library resources
- Adaptive learning systems for information literacy instruction
- Customizable notification systems for new acquisitions and events

5.3 Seamless Integration of Physical and Digital Spaces

Libraries are blending physical and digital experiences:

- Smart library furniture with integrated technology
- Augmented reality applications for wayfinding and collection browsing
- IoT devices for space utilization analysis and environmental control

Table 2 presents user satisfaction ratings for various library service innovations:

Table 2: User Satisfaction with Library Service Innovations (2024)

Service Innovation	User Satisfaction Rating (1-5)
Personalized Recommendations	4.3
Mobile Library Apps	4.1
Self-Service Kiosks	3.9
AR Collection Browsing	3.7
AI Chatbot Assistance	3.5

6. INFORMATION LITERACY AND DIGITAL COMPETENCIES

The proliferation of digital information sources has heightened the importance of information literacy and digital competencies.

6.1 Evolving Information Literacy Frameworks

Libraries are updating their information literacy programs to address new challenges:

- Critical evaluation of online information and fake news detection
- Understanding of algorithmic bias in search engines and social media
- Ethical use of information and digital citizenship

6.2 Gamification and Interactive Learning

Engaging methods for teaching information literacy skills are being developed:

- Escape room-style challenges for database searching
- Virtual reality simulations for research scenarios
- Badges and micro-credentials for skill acquisition

6.3 Embedded Librarianship and Curriculum Integration

Librarians are collaborating more closely with faculty to integrate information literacy into academic curricula:

- Co-teaching of research methods courses
- Development of discipline-specific information literacy modules
- Assessment of information literacy outcomes in academic programs

Figure 3 illustrates the most requested information literacy topics:

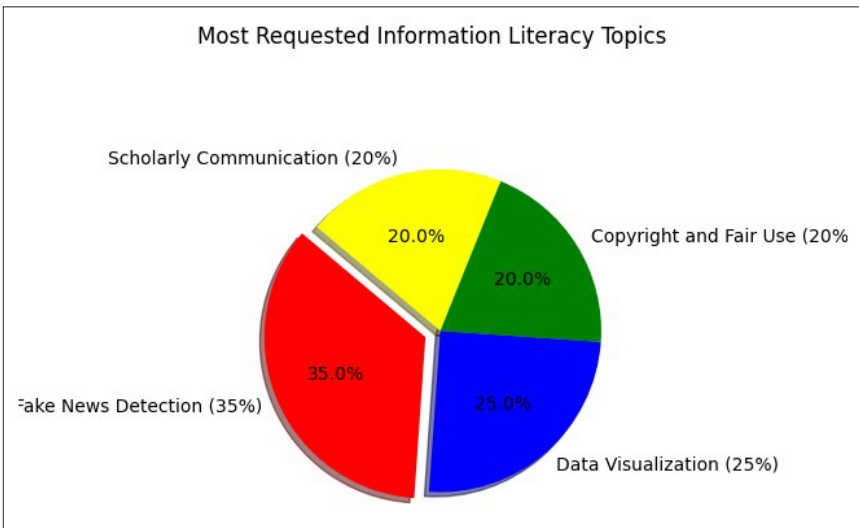


Fig. 3: Most Requested Information Literacy Topics (2024)

7. OPEN ACCESS AND SCHOLARLY COMMUNICATION

The open access movement continues to reshape the landscape of scholarly communication, with libraries playing a pivotal role.

7.1 Institutional Repositories and Open Access Publishing

Libraries are expanding their support for open access initiatives:

- Development and management of institutional repositories
- Support for faculty in negotiating open access agreements with publishers
- Creation of open access publishing funds and services

7.2 Alternative Metrics and Impact Measurement

New approaches to measuring scholarly impact are being explored:

- Integration of altmetrics into institutional repositories
- Development of comprehensive research impact dashboards
- Advocacy for responsible use of metrics in research evaluation

7.3 Preprint Servers and Rapid Dissemination

Libraries are supporting the growth of preprint culture:

- Partnerships with disciplinary preprint servers
- Education on the benefits and limitations of preprints
- Integration of preprints into discovery systems

Table 3 shows the growth of open access content in academic libraries:

Table 3: Growth of Open Access Content in Academic Libraries

Content Type	Percentage of Open Access (2020)	Percentage of Open Access (2024)
Journal Articles	35%	55%
Monographs	15%	30%
Conference Proceedings	40%	65%
Research Data	25%	50%

8. EMERGING TECHNOLOGIES IN LIBRARY OPERATIONS

Libraries are leveraging a range of emerging technologies to improve efficiency and expand services.

8.1 Internet of Things (IoT) Applications

IoT devices are being integrated into library environments:

- RFID systems for inventory management and self-checkout
- Smart shelves for real-time collection monitoring
- Environmental sensors for preservation of sensitive materials

8.2 Blockchain for Library Services

Blockchain technology is being explored for various library applications:

- Secure management of digital rights and licenses
- Decentralized platforms for inter-library loan systems
- Transparent tracking of research outputs and citations

8.3 Extended Reality (XR) in Libraries

Virtual, augmented, and mixed reality technologies are enhancing library experiences:

- Virtual tours of special collections and archives
- Augmented reality apps for library navigation and resource discovery
- Immersive learning environments for information literacy instruction

Figure 4 presents the adoption rates of emerging technologies in libraries:

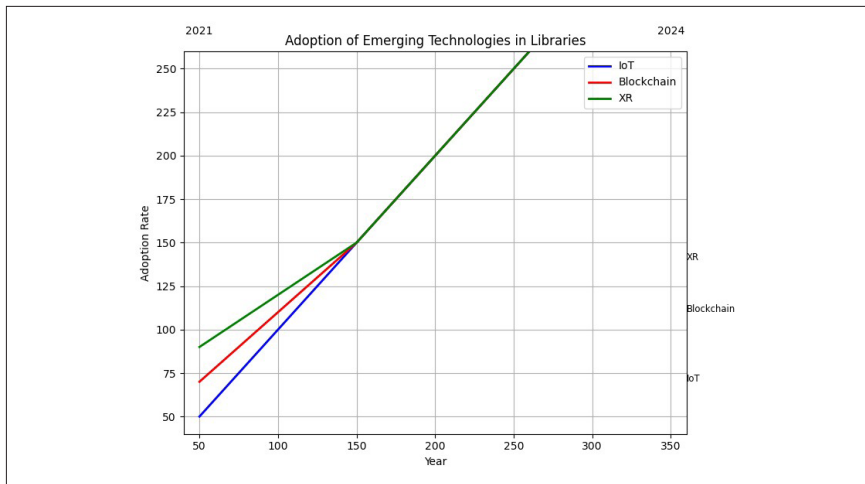


Fig. 4: Adoption of Emerging Technologies in Libraries (2021-2024)

9. CONCLUSION

The field of Library Science is undergoing a profound transformation driven by technological innovation, changing user expectations, and evolving information ecosystems. This paper has explored several key trends and techniques that are shaping the future of libraries and information services:

1. Digital libraries and archives are expanding the reach and accessibility of collections, while facing new challenges in preservation and curation.
2. Data management and curation have become critical roles for libraries in the age of big data and open science.
3. Artificial intelligence and machine learning are revolutionizing information retrieval, user assistance, and collection management.
4. User experience design principles are being applied to create more intuitive and engaging library services.
5. Information literacy programs are adapting to address the complexities of the digital information landscape.
6. Open access initiatives are reshaping scholarly communication, with libraries playing a central role in advocacy and infrastructure development.
7. Emerging technologies like IoT, blockchain, and extended reality are opening new possibilities for library operations and services.

These trends reflect a shift in the role of libraries from mere repositories of information to active facilitators of knowledge creation and dissemination. Librarians are evolving into multifaceted information professionals, combining expertise in technology, data management, and user-centered design with traditional skills in information organization and retrieval.

As libraries continue to adapt to these changes, several key challenges and opportunities emerge:

- Balancing digital innovation with the preservation of traditional library values and services
- Addressing issues of privacy, data security, and ethical use of AI in library contexts
- Developing sustainable funding models for open access initiatives and digital infrastructure

- Ensuring equitable access to information and technology in an increasingly digital world
- Cultivating partnerships with technology providers, publishers, and other stakeholders in the information ecosystem

The future of Library Science will likely see further integration of emerging technologies, increased collaboration across institutions and disciplines, and a continued focus on user-centered, data-driven approaches to service design. As information landscapes continue to evolve, libraries must remain agile, innovative, and committed to their core mission of facilitating access to knowledge for all.

By embracing these trends and techniques, libraries can position themselves as essential institutions in the digital age, fostering information literacy, supporting research and innovation, and serving as vital hubs for community engagement and lifelong learning.

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17

Reflections on Delhi University College Libraries in India: Accessibility and Inclusivity

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Abstract

This article examines the accessibility and inclusivity of college libraries within Delhi University, one of India's premier academic institutions. Libraries play a crucial role in supporting students' academic and research needs, yet questions remain regarding their accessibility to all students, including those with disabilities or from marginalized communities. Objectives: This research highlights the accessibility of college libraries, examines the inclusivity of library services, the challenges and issues in accessing the library resources, also efforts made by libraries to promote inclusivity, and recommendations for future improvements. Method: The study has been conducted through the survey of the various web portals of colleges of University of Delhi. The study provides a reflective view on the progress and shortcomings in ensuring equitable access to information for all students.

The accessibility and inclusivity of Delhi University College Libraries play a critical role in shaping an equitable academic environment for students from diverse backgrounds, including those with disabilities. Steps have been taken in this regard which has to be strengthened by advanced technology for inclusivity, inclusive collection development, staff training, collaboration with disability centers and improvement in physical accessibility.

Keywords: Library Services, Resources, College Libraries, Equity, Higher Education, Students, Social Inclusion, Policies, Infrastructure

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1. INTRODUCTION

The heart of all educational institutions are the academic libraries supporting the academic journey of students and faculty. One of the largest and prestigious universities in India is University of Delhi catering to the needs of a diverse population of students from all across the world with various regional, socio-economic and linguistic backgrounds. The role of college and departmental libraries play a significant role catering to the needs of the diverse population of students.

There are more than 37 libraries under the Delhi University Library System catering to the needs of the academic community. It includes departmental and special libraries, single and multiple disciplined major libraries. The print collection of DULS includes 16,53,277 volumes of books; 1,217 journal titles; 4,56,806 bound volumes of journals; 19,643 volumes of Ph.d thesis; 640 manuscripts and 2000 CDs.

It also has a large collection of e-resources which are accessible through colleges and UGC Infonet Digital Library Consortium. Online services provided by DULS are:

- OPAC
- Open Access Database
- E-books databases
- Subscribed and eSS databases
- A-Z list of e-journals
- E-books available at DULS
- The National Archives of India (NIA) Resources
- Subject Portal
- Information Literacy Online Tutorial
- DU e-library

The American Library of Association focuses on the term “ Inclusion” which refers to treating all individuals respectfully and fairly, value their skills and experiences and have equal access to library resources. Inclusive library accommodates all users in library space, programs and collections. There are around 240 million disabled children worldwide who have their ambitions and dreams. Quality education is required for them to identify their skills and make them realize their potential. Their access to education and social life. Lack of policy, facing continuous stigma and discrimination from the society are the barriers in their overall

development. Inclusive education is the way to overcome this issue. It gives an opportunity to all the children from any background to study in the same school. (UNICEF). UNICEF promoted inclusive education by focusing on:

- Advocacy
- Awareness- raising
- Capacity building
- Implementation support

The term “inclusion” can be well understood from the “*Guidelines for inclusion: ensuring access to education for all*” given by UNESCO. It is an approach to respond to the diversity of students positively, viewing the individual differences not as a problem but as an opportunity to learn. It is a process of addressing the diverse needs of all the learners. Over the years, Delhi University has made several strides toward improving library services, including the adoption of digital resources, increasing access to e-books, and building infrastructure to accommodate students with disabilities. Yet remarkable spaces are left in the implementation and this study focuses on the prevailing situation and reflects on satisfying the demands in the context of accessibility and inclusivity in the services of college libraries.

2. OBJECTIVES OF THE STUDY

- Examining the accessibility and inclusivity in college libraries services
- Identifying the challenges and issues faced by the library staff and students in implementing inclusivity
- Understanding the initiatives taken by college libraries in promoting inclusivity and improving accessibility
- Outlining future recommendations in this aspect

3. LITERATURE REVIEW

Websites of the academic libraries need to be accessible for the users with special needs (Billingham, 2014). Practicing inclusion in the acquisition and purchasing of e-resources in the academic libraries is stressed upon to make them accessible (Falloon, 2016). A study was conducted by Ezeani *et al.* (2017) on the role of academic libraries in Nigeria in achieving the

SDG goals with respect to providing inclusive and quality education for users with special needs. Alabi & Mutula (2020) studied the various assistive tools developed by the academic libraries worldwide for the visually impaired and found that the academic libraries of UK and USA have assisted various tools with library services and JAWS is the most commonly used screen reader software.

Diniz *et al.* (2019) researched inclusive programs and accessibility at Brazil and Portuguese public university libraries for the users with special needs. Yadav & Singh (2022) made an effort to identify the tools used by the disabled persons in the library for study and research. They made a study on IIT students and found that students were satisfied with the library services and also the assistive tools like JAWS, SAFA, ZoomText.

4. ACCESSIBILITY AND INCLUSION IN ACADEMIC LIBRARIES

Accessibility in libraries refers to the ease with which all students, regardless of their physical, social, or economic circumstances, can access library resources and services. Inclusivity, on the other hand, ensures that libraries are welcoming and provide equitable services to students from diverse backgrounds, including those with disabilities, students from rural areas, and students from marginalized communities.

University of Delhi had set up “Equal Opportunity Cell” in the year 2006 to provide equal rights issues to the students from different economic and cultural barriers, minorities and the disabled. This cell ensures that:

- There is no discrimination on grounds of minority status or disability
- Barrier free access to all buildings in the university, departments, colleges, hostels and libraries
- Developing employability skills through short term courses, organizing workshops

5. SCOPE AND METHODOLOGY OF THE STUDY

The study has been conducted through the survey of the various web portals of colleges of University of Delhi. All information has been taken from various websites and the colleges have been selected randomly. Literature surveys had been used to understand the importance of inclusiveness in the library services.

6. FINDINGS AND DISCUSSIONS

Few colleges under University of Delhi had constituted “EnablingUnit” to ensure accessibility and inclusivity for the diverse population of students irrespective of their social, economical, geographical and physical differences. Institute of Home Economics has an Enabling Unit which caters to provide a barrier-free environment. Implementation of awareness programs on admissions, scholarships, beneficiary programs, orientation programs, welfare schemes, conducting workshops, and celebrating special days are conducted by this unit. Group counseling, individual support are provided to the individuals with disability, sensitizing them on several aspects and ensuring social inclusion.

Hansraj College had constituted The Enabling Unit in the year 2011 aiming to provide an accessible and inclusive environment to the differently-abled students. The students are provided with accessible reading materials in audio, braille formats and DAISY. Various aids and devices are provided like personal computers with screen reading and OCR Software, Braille printers and Lex Air Cameras, KIBO XS Scanner. The college library provides a separate sitting room apart from the enabling unit.

The Enabling Unit of Gargi College- SAMARTH promotes inclusive and accessible environment for the PwD students. The Library of Gargi College has a section: ***Inclusive Library-PwD*** which provides services to the readers through National Association for the Blind services-Talking Books, Digital Library. Audio books online are made available to the registered students of the library on request. Digital Library services include:

- Books in audio format- Digital Accessible Information System (DAISY)
- Reading books in electronic formats using screen readers
- National Online Library

The library also gives access to NVDA (Non Visual Desktop Access)Screen Reader. The Library of St.Stephen’s College has a separate Enabling Unit for differently abled students and Visually Challenged. It is equipped with desktop computers with multimedia speakers, headphones, LEX Scanner, Screen Reading Software, laptops with JAWS software, Saksham E-10 Recorder, KIBO XS scanner. Angel e-book readers and MP3 recorders are issued to Visually Impaired students from the library. The Library of Daulat Ram College has a section providing facilities to Divyang students providing online access to Sugamya Pustakalaya, Braille Library of University of Delhi. The enabling unit of the college sensitizes the

students about the discrimination on disability and ensures an inclusive environment for holistic development and ensures well-being.

Amba Dalmia Digital Resource Center for Visually Challenged Students (ADDRC) is the enabling unit of Miranda House Library. It provides assistive devices- JAWS, SAFA, LEKHA, typewriter, wheelchair, softwares. MP3 players, Braille language books, periodicals, computers, scanners in the ADDRRC center. Atma Ram Sanatan Dharma College Library has a special section for students with disabilities. The students have the provision of using a wheelchair, JAWS Screen Reader Software, DAISY reader, Thnikpad, MP3 player, link of various audio books, INDO-NVDA software in this section. Kalindi College Library has 2 systems with NVDA screen reading software for the PwD students. The library also provides access to Sugamya Pustakalaya and e-books through DU Braille Library.

7. RECOMMENDATIONS

Improvement in Physical Accessibility: accessibility to the library may include ramps, elevators, restrooms designed for the physically challenged students. Floor indicators, tactile signage can also be incorporated while designing the library.

- **Technological Advancements for Inclusivity:** Libraries may equip with assistive technologies to support the visually or hearing challenged students. Digital resources like audiobooks may be made accessible to the special students.
- **Library Staff Training:** Ensuring regular training sessions to sensitize the library staff to understand inclusivity and providing services accordingly. Libraries can also collaborate with Institutes or NGOs specializing in disability services to have a better understanding on the practices in inclusivity.
- **Inclusive Collection Development:** Library resources should include diverse collection- accessible formats, different learning styles, linguistic backgrounds catering to the needs of an inclusive population.
- **Library Services:** Online Library Services should ensure accessible website, downloadable content. Personalized and customized services to the student when required.
- **Collaboration:** Collaborating with other departments and organizations to understand the needs of special students

and ensuring relevant services to them. Engaging the student communities in improving the services of the enabling unit would be helpful.

- **Feedback Mechanism:** Evaluating and updating the services based on the feedback received from students and staff.

8. CONCLUSION

The college libraries have transformed from traditional libraries to high-tech libraries. Libraries have always supported the academics of an institution and significant steps have always been taken for the improvement of its services. Accessibility to the college libraries for the students with diverse backgrounds have improved with course of time. The needs and demands of a special child are equally important as that of others. Hence inclusivity has been adopted in the education system implementing inclusivity through improvising physical infrastructure, technological advancements and staff training.

Though the college libraries of Delhi University have adopted inclusiveness in their library services, there is always a space for improvement and reforming the challenges and issues being faced while applying inclusiveness. The recommendations outlined above may contribute to building a supportive, accessible and inclusive environment in the libraries which can be extended to other academic libraries also.

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18

Role of INFLIBNET in the Capacity Building of LIS Professionals: A Comprehensive Overview from University Librarians

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Abstract

The paper underscores the pivotal role of INFLIBNET in the capacity building of the LIS professionals serving in the university libraries of North India. It provides a comprehensive overview of the various perspectives from the university librarian on the significance of INFLIBNET programmes. These programmes, by providing access to a wide range of digital resources, facilitating collaborative research, and offering training programs, have significantly enhanced the skills and knowledge of LIS professionals and improved the overall functioning of the university libraries. The paper also evaluates the impact of these programmes, particularly in terms of the analysis of the pre and post-existence of INFLIBNET.

Keywords: INFLIBNET; Library Professional- Capacity-Building; Capacity-Building Initiatives; Human Resource Development-INFLIBNET

1. INTRODUCTION

Knowledge is recognised as one of the prominent driving forces globally, having the potential for the nation's economic, social, and political transformation. Universities have been the focal point for producing knowledge through teaching, research, innovation, and knowledge

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transfer. Knowledge generation is a comprehensive process that engages many dimensions of higher education. One such dimension of higher education is the library. The library is central in assisting faculty members and research scholars in pursuing and creating knowledge. Over the years, the role of the library has been well-recognised. The Education Commission, under the chairmanship of Dr. S. Radhakrishnan, has conspicuously mentioned the central role of the university library in education and research. The commission referred to the university library as the heart of the institution (India, 1949). Later on, the Kothari Commission (1964-66) opined almost the same view about the role of libraries (Report of the Education Commission 1964-66, 1967). Besides, almost all the national educational policies have unequivocally recognised the role of libraries and have also emphasised quality transformation in libraries regarding assimilating emerging technologies.

The changing paradigm after the emergence of IT and communication technologies has stressed the need to adopt such changes in libraries regarding organisation, retrieval, and dissemination of knowledge. To make libraries capable of accommodating such challenges in the university libraries, the University Grants Commission established an inter-university centre (IUC) as the Information and Library Network Centre (INFLIBNET) at Gandhinagar in April 1991 under the aegis of NITI Aayog (formerly Planning Commission). The centre started functioning as an autonomous inter-university centre of UGC in November 1996. INFLIBNET plays a crucial role in the capacity building of LIS professionals by providing them with access to a wide range of digital resources, facilitating collaborative research, and offering training programs to enhance their skills in managing and disseminating information (*INFLIBNET Centre Gandhinagar*, n.d.).

A country like India, with rapid growth in the higher education sector in post-independent India, together with the massive challenge of supporting scholarship, learning, research and academic pursuit amidst financial constraints/crisis, led to the idea of having an agency at the national level which can play a vital role in pooling, sharing and optimisation of knowledge resources, establish research communications, modernise university libraries and other R&D institutions and ultimately minimises duplication of efforts in acquiring books, journals, services, and other activities. INFLIBNET has been an ambitious national programme of the UGC with a prime objective of transforming university libraries by adopting information and communication technologies. The idea is to ensure quantum progress in higher education by providing library and

information services to the academic and research communities, as it would result in national capacity building.

Since its inception, INFLIBNET has been striving to accomplish various objectives per its mission and vision. One such objective of INFLIBNET has been to provide quality training in computerising libraries and networking to create suitable professional's/human resources to man and sustain the INFLIBNET. This paper has presented the various capacity-building measures taken by INFLIBNET and has elaborated on the perspectives collected on this front from the university librarians of the central universities of North India to highlight the significance of such measures.

1.1 Human Resource Development/ Capacity-Building Programme

One of the prime objectives of INFLIBNET has been to provide training in the use of technologies to develop such human resources capable of maintaining modern libraries and assimilating all emerging technologies suitably for designing and developing new services. INFLIBNET has been actively organising and conducting various specialised training programmes, workshops, conferences, seminars, etc., as part of its mission toward human resource development. Some of the significant activities of INFLIBNET in the HRD are elaborated below.

1.2 HRD ICT Skill Development Programme

Under this programme, INFLIBNET imparts training in the proper use of various Information and Communication Technologies (ICT), awareness of major projects and services of INFLIBNET like the use of resources under e-ShodhSindhu consortium, use of Plagiarism Detection Software (PDS), Shodhganga, SOUL software, and many more. The short-term and long-term training programmes, INFLIBNET Regional Training Programme for Library Automation (IRTPLA), and webinars have been organised. As per the annual report for the year 2021-22, a total of 877 such training programmes have been organised, and 92,168 participants have been trained. During 2021-22, 49 online programmes were organised, including short-term and long-term, and 8039 participants benefitted from such programmes(INFLIBNET Centre, 2022).

1.3 Conventions

INFLIBNET organises two significant conventions, CALIBER and PLANNER, on an alternate year with the sole objective of providing a platform to the

Library and Information Science Professionals, faculty members engaged in LIS education, IT professionals, consultants, users, etc., to share their views, experience, knowledge, etc. on the use of technologies in the automation and networking of libraries. The following table elaborates on the two conventions.

Table 1: Conventions of INFLIBNET

CALIBER	PLANNER
Convention on Automation of Libraries in Education & Research Institutions	Promotion of Library Automation & Networking in the North-Eastern Region
Initiated in 1994	Initiated in 2003
22 conventions organised	11 conventions organised
7475 participants	2630 participants

(Source: Annual Report of INFLIBNET: April 2020- March 2021)

2. OBJECTIVE AND SCOPE

The ultimate goal of INFLIBNET is to empower end-users with a mechanism for sharing and using resources offered by the latest information technologies (Kumar & Arora, 1996). Eventually, to fulfil and achieve its goal, it facilitates training as a part of the capacity-building programmes for the LIS professionals as necessary in applying such emerging technologies.

The prime objective of this paper is to highlight the significance of INFLIBNET's initiatives towards the capacity building of the working professionals of the university libraries. Besides, it will assess the role of INFLIBNET in transforming university libraries in terms of quality enhancement of LIS professionals after its establishment in terms of various capacity-building initiatives.

An excerpt of the research on the evaluation of the role of INFLIBNET on the resources and services of the libraries of the central universities of North India has been dealt with in this paper. This paper has collected and presented university librarians' perspectives of thirteen central universities in North India. This has been done with geographical, economic, and time constraints. A list of all such central universities in North India is illustrated in the table below.

Table 2: List of Central Universities Covered under the Study

Sr. No.	Name of the Central University	Established Year	State/UT
1.	Central University of Kashmir	2009	Jammu & Kashmir
2.	Central University of Jammu	2009	Jammu & Kashmir
3.	Central University of Himachal Pradesh	2009	Himachal Pradesh
4.	Central University of Punjab	2009	Panjab
5.	Central University of Haryana	2009	Haryana
6.	University of Delhi	1922	Delhi
7.	Jawaharlal Nehru University	1969	Delhi
8.	Jamia Millia Islamia	1988	Delhi
9.	HNB Garhwal University	2009	Uttarakhand
10.	Aligarh Muslim University	1920(1875)	Uttar Pradesh
11.	B.B. Ambedkar University	1996	Uttar Pradesh
12.	University of Allahabad	2005(1887)	Uttar Pradesh
13.	Banaras Hindu University	1916	Uttar Pradesh

(Source: Ministry of Education, Govt. of India; UGC)

3. REVIEW OF LITERATURE

INFLIBNET, since its inception in April 1991, has been playing a catalytic role in the overall development of the university library system, access to scholarly content to researchers and faculty members, skill development and capacity buildings under the human resource development programme, resource sharing through consortia (e-ShodhSindhu), building union database of holdings of books (India), journals, theses and dissertations (Shodhganga), database of experts (Vidwan), providing access to plagiarism detection software (Shodhshudhi), and many other innovative programmes.

In their paper, (Kumar & Arora, 1996) elaborated on the objectives, programmes, and services of INFLIBNET. It elaborated on how the INFLIBNET, since its inception in April 1991 by the UGC, has been

assisting universities and colleges in getting access to scholarly content, modernisation and automation of its libraries, and pooling-sharing-optimisation of library resources, human resource development, and so on. In their studies, (Salgar and Murthy, 2003) discussed in detail the objective behind establishing INFLIBNET as an IUC of the University Grants Commission in 1991. They elaborated on how INFLIBNET has been assisting university libraries across the country in being transformed into modern libraries and resource-rich centres. The paper highlights that 142 university libraries were given necessary assistance, and around 600 librarians were provided training during the first decade of its establishment. In their paper, (Vijaykumar *et al.*, 2005) have identified the significant role of INFLIBNET in making a digital divide-free society. INFLIBNET, as an ambitious programme of UGC, was established to assist in the modernisation of university libraries, human resource/workforce development through training, building a union catalogue of holdings of the libraries, and sharing resources through networking of networking libraries, etc.

(Pal, 2017) has conducted a research study leading to a PhD on “Impact of INFLIBNET in the modernisation of university libraries in India with special reference to the North-Eastern region” to assess the impact of programmes of INFLIBNET on the modernisation activities of the universities of the north-eastern region of the country. He studied ten select universities employing various data collection tools and measurement scales. The study concludes that INFLIBNET has played a significant role in the automation activities of the universities, resource-sharing programmes, research output, usage of e-resources, human resource development, etc.

(Pandey, 2018), in his study, surveyed fifteen university libraries in Uttar Pradesh to assess the impact of programmes and activities of INFLIBNET on the automation of libraries, human resource development of library personnel and use of resources of e-Shodhsindhu (ESS).

5. METHODOLOGY

The survey method is considered appropriate in the Social Science discipline (Ghosh, 1984; Goode & Hatt, 1952) and has been adopted to collect the data from the select central universities of North India. (Fowler, 2013) suggested that a sample survey combines three methodologies: sampling, designing questions, and data collection. The survey method

was employed to collect the relevant data from the selected sample of the targeted population, the university librarian/librarian I/c of the central library. A structured questionnaire was designed to collect objective and relevant data to understand the impact of INFLIBNET's initiatives on the capacity-building of library professionals. Two experts vetted the questionnaire. Tabulation and data analysis have been done using Excel (2019) and SPSS (2022). A five-point Likert Scale and a self-designed scale were used to analyse data. A paired sample 't' test assessed the significance of INFLIBNET's initiatives.

6. ANALYSIS AND DISCUSSION

INFLIBNET has been training LIS professionals, enabling them to use the latest technologies to maintain modern libraries. INFLIBNET has been actively organising many short-term and long-term courses, seminars, webinars, conferences, workshops, and specialised training programmes as a part of its capacity-building and professional development programmes. Responses have been gathered from the university librarian on the various dimensions of such initiatives of INFLIBNET. A five-point Likert Scale with five rating scales ranging from 'strongly agree' to 'strongly disagree' was employed to get respondents' perspectives on the initiatives of INFLIBNET. Four (4) correlated statements to assess the effectiveness of the capacity-building programme on the university libraries have been framed, and responses collected on the given statements are shown below.

Table 3: Capacity-Building Programmes

Statement	Nothing to say		Agree		Strongly Agree	
	N	%	N	%	N	%
1. INFLIBNET has played a significant role in the skill development of the working library professional in the university.			8	61.5	5	38.5
2. Library professionals have been trained to utilise suitable technology for various services.			9	69.2	4	30.8

(Table 3 Contd....)

(...Contd. Table 3)

3. INFLIBNET has evolved over the years into an impressive nodal agency for skill development and capacity building of library professionals at the university.			8	61.5	5	38.5
4. Through the participation of library staff in short-term and long-term training programmes, conventions (CALIBER & PLANNER) OF INFLIBNET have resulted in capable human resources for the university library.	3	23.1	5	38.5	5	38.5

Considering the importance of INFLIBNET's initiatives towards capacity building/ skill development of serving LIS professionals at universities, 38.5% (5) of respondents strongly seconded this conclusion, while 61.5% (8) agreed. Such initiatives of INFLIBNET have enabled the LIS professionals to utilise suitable technology for various library services. 30.8 % (4) of respondents affirmed this strongly, and 69.2 % (9) agreed. 38.5% (5) of respondents strongly seconded and decided that over the year, INFLIBNET has evolved into an impressive nodal agency in the country for skill development and capacity building of university library professionals. At the same time, 61.5% (8) of respondents agreed with it. Participation of LIS professionals in various short and long-term training programmes and conventions (CALIBER & PLANNER) of INFLIBNET has transformed LIS professionals into capable human resources for the universities. This statement has been strongly seconded by 38.5% (5) respondents, and an equal number of respondents (38.5%;5) agreed with it. At the same time, 23.1% (3) preferred to remain neutral.

Respondents were asked to confirm if the LIS professionals of their libraries have actively participated in the training programmes organised by INFLIBNET. 92.3% (12) of respondents affirmed the participation of LIS professionals in their libraries in various training programmes of INFLIBNET, while 7.7% (1) preferred to remain neutral.

Table 4: Have the Library Professionals of Your Library Actively Participated in the Various Training Programmes Organised by INFLIBNET?

Response	Respondent (N)	Per Cent (%)
Yes	12	92.3
No	0	0.0
Can't say	1	7.7
Total	13	100.0

All Respondent

Perspectives were also collected concerning the participation of library staff in the CALIBER convention, which is organised biannually by INFLIBNET. 69.2 % (9) of respondents affirmed the participation of their library staff in the convention, while 30.8 % (4) responded negatively, as illustrated below. Out of 69.2% (9) respondents, only 33.3% (3) have cited the number of participants of their libraries in the convention, as illustrated below.

Table 5: Have Your Library Staff Participated in the CALIBER/PLANNER Convention Organised by INFLIBNET?

Responses	Respondent (N)	Per Cent (%)
Yes	9	69.2
No	4	30.8
Can't say	0	0.0
Total	13	100.0

All Respondent

Table 6: Total Number of Participants who Attended the Convention.

No. of Participants	Respondent (N)	Per Cent (%)
0	10	76.9
1	1	7.7
3	1	7.7
6	1	7.7
Total	13	100.0

All Respondent

Training programmes and conventions of INFLIBNET have been a mechanism for LIS professionals' capacity building and skill development to transform the university library. Such a platform enables LIS professionals to learn and implement emerging library technologies. 84.6

% (11) of respondents agreed with this outcome, while 15.4% (2) opted for neutrality, as illustrated below.

Table 7: Did the Participation of the Library Professionals of Your Library in the Conventions and Training Programmes of the INFLIBNET Help the Library in Its Transformation through the Implementation of Technologies?

Response	Respondent(N)	Per Cent (%)
Yes	11	84.6
No	0	0.0
Can't say	2	15.4
Total	13	100.0

All Respondent

A five-point rating scale was employed to assess the changes and impact that occurred due to the programmes, services, activities, etc., of INFLIBNET on the university library. Respondents were asked to choose and mark the preferred scale between 1 and 5 against the statements. While 1 (0-20) represents the lowest scale, 5 (80-100) is the maximum. All respondents' perspectives on the given statements and scale are illustrated below.

Table 8: Impact of Programmes/Activities/Services of INFLIBNET on Human Resources Development

1. ICT Skill development of library professionals under HRD programme (Training programmes & Conventions)					4	30.8	6	46.2	3	23.0
2. INFLIBNET has succeeded in transforming the functioning of the university library through its mission, vision, and objectives.					3	23.0	6	46.2	4	30.8

(Table 8 Contd....)

(...Contd. Table 8)

3. Role in enhancing library operations' knowledge, skills, and capabilities in the digital environment.	1	7.7			2	15.3	6	46.2	4	30.8
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Human Resource Development initiatives/programmes of INFLIBNET, under which various training programmes and conventions are organised, have been assisting the LIS professionals of the university libraries in their ICT-based skill development. Concerning such programmes, a scale of 5, 4, and 3 have been preferred by 23.0% (3), 46.2% (6), and 30.8 % (4) respondents. INFLIBNET has succeeded in transforming the functioning of the university library through its mission, vision, and objectives. Concerning this conclusion, a rating scale of 5, 4, and 3 has been preferred by 30.8% (4), 46.2% (6), and 23.0% (3) of respondents. Similarly, a scale of 5, 4, 3, and 1 has been preferred by 30.8% (4), 46.2% (6), 15.3% (2), and 7.7% (1) of respondents on the role of INFLIBNET in the enhancement of knowledge, skills, and capabilities of library operations in the digital environment.

6.1 Descriptive and Inferential Statistics

Regarding assessing the visible impact of INFLIBNET on the capacity-building/Human Resource Development of serving Library Professionals and evaluating the corresponding effect on the functioning and transformation of the university libraries, a paired sample t-test (two-tailed test) has been conducted against the statements/variables corresponding to pre-and post-INFLIBNET period. There has been a significant difference between the calculated value of t and its corresponding tabulated value at the given df (degree of freedom), as illustrated below. The high computed values of 't' indicate the vital effects of INFLIBNETS's programmes, activities, and services on university libraries.

Table 9: Paired Samples 't' Test

Paired Statements	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 BEFORE_1 Before the launch of INFLIBNET:- Regular ICT-based skill development/ professional development of university library professionals. - AFTER_1: After the launch of INFLIBNET, there will be regular ICT-based skill development/ professional development for university library professionals.	-1.769	.832	.231	-2.272	-1.266	-7.667	12	0.000006
Pair 2 BEFORE_2 Before the launch of INFLIBNET:- The Availability of a regular platform for sharing ideas and practices for the implementation of emerging dependable technologies (CALIBER) in the university libraries - AFTER_2:- After the launch of INFLIBNET:- The Availability of a regular platform for sharing ideas and practices for the implementation of emerging & dependable technologies (CALIBER) in university libraries	-1.692	1.548	.429	-2.628	-.757	-3.941	12	0.001960

7. FINDING AND CONCLUSIONS

The analysis and interpretation of perspectives collected from the university librarian on the various dimensions of the capacity-building/human resource development programme of INFLIBNET have led to drawing the following conclusions:

- There has been a consensus amongst all the university librarians concerning the significant role of INFLIBNET towards the capacity-building/professional development of the working library professionals in the university libraries.
- INFLIBNET, through its various training programmes, etc., has enabled library professionals to optimise suitable technology for varied library operations and services. Agreement to this amongst university librarians is a testament to the impact of INFLIBNET on the professional development of library professionals.
- University librarians considered INFLIBNET as an impressive nodal agency that has evolved over the years to impart skill development and capacity building for serving library professionals of the universities.
- Library staff participate in short- and long-term training programmes and international conventions (CALIBER) conducted by INFLIBNET, transforming them into capable future-ready human resources for the university library.
- The mean values calculated against each of the statement/variables corresponding to various dimensions of the Human Resource Development/Professional Development programme of INFLIBNET indicate a firm agreement regarding its usefulness for capacity building and skill development of library professionals and its corresponding impact on the functioning of university libraries. Many previous studies aligned with the conclusions (Chauhan & Chand, 2007; Devi & Singh, 2006; Karn & Das, 2009; Salgar & Murthy, 2003; Waghmode, 2014)
- Almost all the university librarians (twelve out of thirteen) affirmed active participation of their library staff in the various training programmes organised/conducted by INFLIBNET.
- Participation of the library professionals of the university libraries in the conventions and training programmes of INFLIBNET has helped the libraries transform by optimally employing the latest and emerging technologies.

Capacity-building/Professional development of Library and Information Science professionals is of utmost importance to make them a future-ready and capable workforce. INFLIBNET, through its myriad initiatives, has played a vital role that the university librarians have recognised. The outcome of this research proves beyond doubt how an effective nodal agency can bring forth transformation in libraries. INFLIBNET has proved its fruitful existence over the years, and still, the juggernaut is on the way. The only lesson we as a librarian must learn to make ourselves ready to be changed per the shifting dimensions of the future.

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Smart Libraries

Ritu¹ and Kshitiz Bhardwaj²

Abstract

In the recent past, smart libraries have become a revolutionary element in India's educational and information system. The intelligent libraries incorporate ideas in artificial intelligence, IoT, the Cloud, and data analysis to provide better service to its users and fully optimise the accessibility of the knowledge. Some of these libraries are no longer just a storing house for books but they have emerged the central place for accessing information in the digital society and an optimal balance of the traditional and the advanced technology. This paper has identified that the implementation of smart technologies in the context of Indian libraries can help to support various issues: spatial limitations, resources management, and users' involvement. Cataloguing through AI-based technology and recommendation leads to the right kind of content finding by users while IoT smart shelves for book management. Further, digital platforms and mobile applications also offer figures and materials stored in distant archives; thus, learning is open for people with various opportunities and disabilities.

Smart libraries in the educational institutions encourage the changes in learning process and education delivery in general by providing students and researchers with opportunities to use advanced tools such as virtual

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reality. They also enable cohort sharing of knowledge through messages boards and discussion forums. Further, the insights that emanate from such libraries facilitate rational resource allocation as well as improvement of service provision. However, the general adoption of smart libraries in India is still a problem due to but not limited to costs, lack of digital literacy and upgrade infrastructures. However, smart libraries have the potential of initiating transformational changes with the current interest of governments and private players in adopting digital solutions and therefore move India towards a well-read society.

1. INTRODUCTION

The concept of libraries as physical spaces for the collection, organization, and dissemination of information has been a cornerstone of human civilization for centuries. From ancient repositories of knowledge like the Library of Alexandria to the public libraries of the modern era, these institutions have evolved in response to the changing needs of society. Traditionally, libraries have served as vital resources for education, research, and cultural preservation, offering a vast array of physical materials such as books, manuscripts, and archival documents. However, with the advent of the digital age and the rapid development of new technologies, the role of libraries has undergone a significant transformation. One of the most prominent outcomes of this shift is the emergence of the “smart library.”

A smart library represents a synthesis of traditional library functions with cutting-edge digital technologies, designed to provide enhanced user experiences, improve operational efficiency, and expand access to information. The integration of technologies such as artificial intelligence (AI), the Internet of Things (IoT), big data analytics, and cloud computing enables smart libraries to offer more personalized, automated, and data-driven services. These technologies empower libraries to not only streamline their operations but also better serve a digitally savvy population that increasingly demands instant access to information, whether through physical or digital means.

The digital age has brought about dramatic changes in the way people access and consume information. With the rise of the internet, smartphones, and social media, users expect immediate, on-demand access to knowledge and resources. In response, libraries must rethink their traditional models of service delivery. Smart libraries address these

expectations by incorporating AI-driven systems that assist with tasks such as cataloging and search optimization, IoT devices that automate inventory management and environmental control, and cloud-based platforms that allow users to access digital content from anywhere in the world. In addition, big data analytics enable smart libraries to gather and analyze vast amounts of data on user behavior, helping them tailor services to individual needs and forecast future demand for resources.

One of the fundamental goals of a smart library is to enhance the user experience by making information access more seamless and efficient. For instance, AI-powered chatbots can assist users in locating books, answering queries, and even recommending resources based on individual preferences. Meanwhile, IoT technologies allow libraries to monitor and manage physical environments, adjusting lighting and temperature in study areas to create more comfortable spaces. Such innovations demonstrate how technology can be harnessed to create a more user-centric library experience.

However, the shift toward smart libraries is not just about technological enhancements; it also reflects broader societal changes in how knowledge is consumed and disseminated. Today's users expect libraries to provide not only traditional print resources but also digital content, multimedia, and interactive learning tools. This has led to the rise of hybrid libraries that blend physical and digital collections, allowing users to access resources in the format that best suits their needs. Moreover, the increased focus on digital inclusivity means that smart libraries play a critical role in bridging the gap for those who may lack access to digital technologies in their personal lives.

In conclusion, smart libraries represent a new paradigm in library science, one that merges the enduring value of physical spaces with the limitless potential of digital technology. They stand at the intersection of tradition and innovation, offering new ways for individuals to engage with information, while still honoring the libraries' historical roles as custodians of knowledge. As technology continues to evolve, smart libraries are poised to remain at the forefront of information management, ensuring that users can access, explore, and create knowledge in ways that are more dynamic and inclusive than ever before.

2. OBJECTIVES

- 1. To Explore the Role of Technology in Transforming Library Services:** This research aims to investigate how technologies such

as AI, IoT, and big data analytics are being integrated into library systems to automate processes, improve resource management, and enhance user experience. Understanding this technological shift will help in assessing the operational and functional improvements brought about by smart libraries.

2. **To Analyze the Benefits and Challenges of Implementing Smart Libraries:** The objective is to evaluate both the positive impacts, such as improved accessibility, personalized services, and increased operational efficiency, as well as the challenges, including high implementation costs, data security concerns, and the need for digital literacy. This analysis will offer a balanced view of smart libraries' potential and limitations.
3. **To Identify the Future Trends and Prospects of Smart Libraries:** This research seeks to predict the future trajectory of smart libraries by examining current trends and technologies in library science. Special attention will be given to emerging innovations such as blockchain, augmented reality, and AI-driven content management. These insights will help stakeholders prepare for the future of information management.

For further reading on the subject, consider exploring *"The Role of AI in Modern Libraries"* by Ferguson (2019), and *"The New Librarianship Field Guide"* by Lankes (2016). Both provide valuable insights into how libraries are evolving with the use of advanced technologies.

3. LITERATURE REVIEW

The transformation of libraries into "smart libraries" is an evolving field that merges traditional library practices with advanced technologies. The adoption of artificial intelligence (AI), the Internet of Things (IoT), big data analytics, and cloud computing has driven a new wave of innovation in the way libraries manage resources and interact with users. This literature review explores the existing body of research on smart libraries and examines real-world case studies that highlight the benefits, challenges, and future directions of this technological evolution.

3.1 The Concept of Smart Libraries

The term "smart library" has gained traction as libraries seek to integrate modern technologies into their systems to remain relevant in

a digital-first world. According to Schaffert *et al.* (2021), smart libraries are characterized by their ability to enhance library services through automated systems, digitization, and personalized user experiences. These libraries shift from being passive repositories of knowledge to active facilitators of information exchange.

A key feature of smart libraries is the use of artificial intelligence. AI automates processes such as book sorting, cataloging, and keyword searches. Leetaru (2020) discusses how AI can improve search capabilities by understanding the context of user queries, delivering more accurate and relevant results. Moreover, AI-driven recommendation systems enhance personalization by suggesting books and materials based on user preferences, similar to algorithms used by platforms like Netflix or Amazon.

The Internet of Things (IoT) is another foundational technology in smart libraries. IoT devices, including RFID tags, sensors, and environmental monitors, enable libraries to track physical assets and monitor the usage of spaces in real-time. IoT's application in library operations is widely discussed in studies like that of Zheng *et al.* (2019), which emphasizes its role in automating mundane tasks such as checking inventory and managing environmental conditions like lighting and temperature.

Big data analytics enables libraries to analyze user behavior and optimize their services based on usage patterns. Smart libraries use big data to identify trends in resource usage, predict demand, and manage inventory more efficiently. Benard and Lin (2022) argue that libraries can use this data to make informed decisions about acquisitions, staffing, and spatial planning.

Cloud computing plays a pivotal role in making library resources more accessible. Through cloud platforms, users can access digital books, academic papers, and multimedia resources remotely, further expanding the library's reach beyond its physical boundaries. The integration of cloud services into library systems, as described by Yang (2020), also enhances collaboration between libraries, allowing them to share digital resources globally.

3.2 Case Studies of Smart Libraries

To better understand how smart libraries function in practice, it is valuable to look at case studies from institutions that have successfully adopted these technologies.

3.2.1 Singapore National Library Board (NLB)

Smart library ... Singapore's National Library Board is one of the best-programs of automated library system to fulfilment of the necessary population services. The NLB has adapted and re-innovated many of its services to appeal with a generation of people who are inclined to technology and the use of the internet. Based on the findings of Tan and Tan (2021), NLB employs RFID technology to regulate its collections, facilitate users' borrowing and return, and Currently, one of the core activities of the NLB is the "Library on Wheels," which delivers mobile libraries with Wi-Fi and digital content in various districts of the city. This effectively means that the resource is brought closer to users in physical and digital structures, as well as in the middle of nowhere Empty Citation By also designing what users are likely to want to read based on their borrowing history through AI-recommended systems, the NLB makes each interaction unique to the user. Also, the signatory library employs data analysis in determining the trends of use of its users so that NLB can make decisions when it comes to acquiring resources and funding.

The use of smart library system has enhanced the NLB operational performance as well as user experience. These staff-intensive activities such as cataloging and inventory management have been made easier through the use of technology thus freeing up time for staff to concentrate on other tasks that may be of more value from the users point of view. Furthermore, IoT devices for monitoring the prevailing conditions in the environment make spaces friendly for users, thereby improving on the feel of spaces.

3.2.2 University of Oulu, Finland

Another successful example of the smart library is the library of the University of Oulu in Finland. This institution has adopted IoT and AI technologies for improving the customer experience within the designed facility. According to Suomi (2020), IoT sensors are employed by the library to control aspects such as the temperature and lighting in the environment by detecting the presence of users. This not only enhances the comfort of the users, but it also conserves energy throughout the library making it savvier.

Book circulation and easy organization is also enhanced through the use of Radio frequency Identification- RFID technology. As far as navigation

of books is concerned, it is very easy for the library to find any misplaced item, sort returned books and sometimes is capable to send messages to the users saying that the particular books are now available in the library. Also, the selected AI tools help librarians decide which books to buy and on which topics people borrow most often.

However, one of the most valuable parts of the concept proposed by the University of Oulu smart library system is the ability to create a utility for the user. The library also uses artificial intelligence in ordering books that suit a given user's personality, and the library has a mobile app that helps the users to know the availability of resources, bookings and occupancy of study rooms. All these features show the institution's endeavor to design the library using the best features that will give a unique and easy to use library.

3.2.3 New York Public Library (NYPL)

This paper examines how the New York Public Library (NYPL) has adopted smart technology in the current society as a way of developing new strategies of delivering these services and make the material accessible to library users across the world. How it works, as described by Greenfield (2019), the NYPL has adopted an AI-operated **digital catalog** that enriches the search function and advises on books to read. It allows users to search for content more effectively and, at the same time, suggests content to the reader based on that reader's habits.

One of the peculiarities of NYPL is, finally, it has reading rooms, which are in fact virtual rooms where everyone can read manuscripts and rare documents without even entering the library physically. They engaged the library resources to the global community thereby eliminating the issue of regionalism. In addition, the current library has available several services such as digital borrowing of books, app booking of rooms, and real-time updated availability of library items.

Along with received its users, NYPL also assigns big data analytics for decision making of resources and human capitals. With this information it will be easier for the library to determine when most users make requests, control usage of the space and determine future trends of usage of the resources. Credibly, this approach has assisted NYPL to improve its operations and attempt to meet the needs of all unique clientele.

4. BENEFITS OF SMART LIBRARIES

1. **Enhanced User Experience:** AI and data analytics help smart libraries provide users with individual services, like book suggestions and learning paths, therefore making people happier.
2. **Increased Accessibility:** Such services that are availed by cloud computing and specific mobile application allow the access of library resources from anywhere ignoring geographical and time restrictions.
3. **Operational Efficiency:** Calendars, labels, and CDs help categorize books also as well as sorting and organizing of the books make operations easier to run without much physical work and mistakes.
4. **Sustainability:** Smart environmental controls by IoT in libraries lower energy issues such as lighting, heating or air conditioning based on occupancy, making the act greener.
5. **Data-Driven Decision Making:** Through the use of big data analytics, libraries come now employ user behaviors, effectiveness of collections as well as the likely demand of resources in future hence the library acquisitions and space allocation is intelligent.
6. **Improved Resource Management:** RFID and IoT systems help in tracking circulation of books at real time, minimizing losses, easier book returns and better availability of assets.
7. **Increased Inclusivity:** Intelligent libraries include functions like text to speech, the digital Braille reader and multi language accessibility to meet the need of the disabled as well as individuals with different languages.
8. **Adaptive Learning Environments:** IoT technologies control factors such as lighting, temperature and space in study zones, with usage patterns in real time, thus users are provided with more positive environments.
9. **Remote Collaboration:** Synchronous applications enable desk sharing, enable cross national and geographic cooperation on research issues, and enable collaborative use of common electronic resources, make academic and scholarly relationships.
10. **Better User Engagement:** Such services as virtual reading rooms, touch-screen exhibitions, and voice-activated robots help to enhance the interest people are willing to show to the library and the methods of how to interest people with different means.

5. LIMITATIONS OF SMART LIBRARIES

1. **High Implementation Costs:** There is high initial cost to implement the smart technologies such as AI, IOT devices, RFID and even big data analytics and therefore large libraries or those in developing the world are still finding it hard to secure the necessary capital to adopt smart systems.
2. **Data Privacy and Security Concerns:** Smart libraries gather lots of personal data, which can be sufficient to compromise the users' rights to privacy. Standards like the GDPR compliance are one of the most crucial, but difficult tasks to implement.
3. **Digital Divide:** A few clients may not be privileged to possess these tools or integrate them into use hence being locked out of smart library system by virtue of their low digital literacy levels.
4. **Continuous Maintenance Costs:** Every application and software used in smart technologies or devices, their hardware, firmware and repairs, or cybersecurity services cost money in the long run.
5. **Dependence on Technology:** Failure to make adequate preparations will lead to system exposure, wherein offering denial-of-service is the least negative outcome. Because some of the key plot points viewed as important library services revolve around the networks, there may be failures or technical issues that lead to disruption of the service.
6. **Staff Training Requirements:** These smart library technologies come as specializations. Library staff development should be carried on a continuous basis which is time-consuming, energy and money demanding.
7. **Potential for Job Displacement:** Such an implementation may lead to the. Library replacing particular employees, or reallocating their duties to other assignments within the facility.
8. **Technology Obsolescence:** Due to the nature of increased rate of technology diffusion, the hardware and software components of smart libraries may become obsolete frequently and need to be replaced.
9. **User Resistance to Change:** There are some people especially those of advanced ages who do not like new changes from the conventional procedures in terms of service delivery and would prefer engaging an actual person.
10. **Ethical Concerns Around AI:** AI systems in smart libraries can also potentially wedge themselves into recommendation algorithms or decision-making processes and thus alter user behaviour in unexpected ways due to a possibility of bias.

6. SUGGESTIONS FOR ENHANCING SMART LIBRARIES

- 1. Develop Comprehensive Training Programs for Staff:** Another impact by adoption smart library is the ability to implement the new technologies and require skilled human capital to operate them. Many libraries must commit to investing in ongoing professional development initiatives so the staff will be prepared to interact with AI, IoT, data, and cloud-based technologies.
- 2. Ensure User-Centric Design:** To achieve the vision of smart libraries for all it is therefore equally essential to develop solutions that are easy to interface for those who do not have an extensive experience when it comes to technology. There should be simple search options with clear and relevant categories for users, which play a part in knowledge intermediation by providing linguistic translation and explaining how the service works to clients.
- 3. Strengthen Data Privacy and Security Measures:** Due to the enormous number of users that smart libraries interact with, factors of data security have to be properly addressed. Libraries should use professional level encryption, be in accordance with the law on privacy (such as GDPR), and perform security scans to find possible weak points.
- 4. Promote Digital Literacy Initiatives:** Hence some users are unable to handle the digital measures that are needed for successful performance in smart libraries. To fill this gap, libraries can provide training and materials that teach the user how to best engage with Web2.0 tools, how to access e-books, use the library apps, and how to best take advantage of the services being provided by AI.
- 5. Foster Inclusivity Through Assistive Technologies:** The essence of smart libraries should also make sure that their services are also accessible to people with disability. Additional features to enhance the technology for visually or physically disable users include; screen readers, digital Braille, voice commands and audio clips.
- 6. Adopt Sustainable Technologies:** Libraries should prioritize energy-efficient IoT devices and cloud platforms that minimize the environmental footprint. By incorporating sensors that control lighting and temperature based on occupancy, libraries can create a more sustainable and cost-effective environment.
- 7. Collaborate with Other Libraries and Institutions:** For greater efficiency with regard to the distribution of resources, smart

libraries can develop relations with other institutions and especially academic libraries, building several connected systems. This would make it possible for users to not only access an extended variety of print and electronic resources via shared cloud services and inter-library loaning systems but also to educate other users or beneficiaries on the contents of available resources.

- 8. Engage Users Through Interactive and Hybrid Experiences:** It is recommended that libraries should look for services that are in the transition from physical to digital services. For instance, introducing virtually facilitated tours of historical collection, augmented reality space exhibits as well as interactive e-learning curriculum can broaden the experience, as well as the physical engagement a user might have with a traditional library.
- 9. Implement Continuous User Feedback Systems:** From the case, it is clear that regular feedback from users can assist libraries to perform necessary adjustments in order to make the required changes on what they offer to the users. At the same time, references to the use of feedback systems based on AI or user questionnaires allow staying close to users' needs and enhancing the quality of the given services.
- 10. Plan for Technological Upgrades:** Considering the great amount of innovations in technologies, it is necessary to point to the existence of long-term plans in libraries' activities in relation to the constant modernization of smart systems. This is in terms of putting aside monitory provisions for the future expansion of the network and ensuring that the implemented technologies are flexible enough to accommodate future expansion.

7. THE FUTURE OF SMART LIBRARIES IN INDIA

The transformation of India to smart libraries is one of the possibilities that which is likely to transform the educational, cultural, and informational sector in India. The accelerated growth of digital technologies, the demand for a knowledge-based economy, the governmental attempts to create a digital society, the introduction of new formats of using library spaces – all this contributes to the establishment of smart libraries as new determinants of knowledge access. There are few survival indicators of trends, opportunities, and challenges that are expected to dominate smart libraries in India in the future.

- 1. Digital transformations in libraries:** One of the two drivers of smart libraries in India will be the increasing availability of digital resources. In many libraries the book, manuscripts, and academic papers are being processed with the hope of being done online. As more and more institutions have moved towards digitization of records, Indian libraries will naturally switch to cloud-hosted systems where users can access resources off-site.

Moreover, mobility solutions in terms of mobile applications and AI-driven platforms are reported to perform important contribution in improving user engagement. Mobile apps will offer digital borrowing facilities, interactive reading suggestions, and immediate information of library service delivery. Furthermore, the Cataloging systems and search optimisation algorithms will revamp the working of the libraries in India.

- 2. Improving the Availability of and Equal Opportunity for Courses:** India is a large country, rich in the overall diversity and a large portion of the country's population still resides in rural and other remote areas where physical access to libraries and smart sources is highly limited. The need for such an approach is to be filled by smart libraries that use digital support to reach innovative users in distant areas. by the use of cloud computing and mobile technology, the people in the rural areas will have same opportunity like those in urban areas. It can help to provide equal opportunities for education and to increase the level of knowledge, which is also the objectives of the India's development strategy in terms of digitalization.

It became clear that through the use of digital platforms it is possible to address a large and diverse population; such examples are in the NDLI project with millions of educational resources. As smart libraries evolve, similar initiatives such as this will become necessary to prevent India from increasing its digital exclusion rates.

- 3. Successful Integration of Modern Technologies:** The use of technology solutions in the year will continue to advance and the subsequent Indian libraries are bound to embrace
 - ◆ Artificial Intelligence (AI);
 - ◆ Machine Learning (ML);
 - ◆ Virtual Reality (VR);
 - ◆ Augmented Reality (AR);
 - ◆ Internet of Things (IoT) in order to offer richer and personalized library experience.

- Search features can be enhanced through AI and ML which makes the determination of resources a user is likely to use through the context of the user's activities. For example, to filter book suggestions of specific domains, Artificial Intelligence based preview and recommendation solutions can improve the refined learning processes.
- AR and VR training could be used to teach how certain objects from historical collections look if displayed or how interactive exhibits containing elements in both physical and digital realms could be arranged.
- IoT presents an opportunity to control the operation of a library, such as the inventory, environment, and space, to fully capitalize on resources.

4. **Integration of New Media and User Education:** In order for smart libraries to work in India, the following areas will need major emphasis on digital literacy. With the ever-increasing adoption of smart systems in libraries, the users will need the relevant knowledge and skills to operate in digital environments and use the technologic tools.

Thus, the educational institution in conjunction with the government agency will probably establish digital literacy programs for users of the platforms to enable them develop these skills. Probably digital literacy could be delivered through public libraries as the centers where people can learn about the proper usage of technologies, search for the necessary databases, and get the information about their rights and protection online. This focus on digital literacy will be important to keep smart libraries for the elderly with ticket effective to people of all ages and those from marginalized communities.

5. **Government Policies and Schemes:** The Indian government have been very active in matters to do with digitization through the adoption of projects such as Digital India and the Smart Cities Mission; projects that seek to transform both the physical infrastructure as well as the services rendered by libraries among others. It can be anticipated that as these types of programs go through the development phases, libraries all across the nation will receive additional funding and support to help them progress to the digital front.

The National Mission on Libraries (NML) that deals with enhancing and overhauling public libraries and formation of virtual library

network of any country gives the direction for the development of libraries in India. As the government focuses on an information society by adopting digitalization policies for the creation of Smart Libraries more organizations especially the educational and the public library systems will move forward in the development of Smart Libraries.

6. Challenges Ahead: While the future of smart libraries in India holds significant promise, there are several challenges that must be addressed to realize their full potential:

- **Infrastructure and Connectivity:** Unfortunately for India it is still a challenges to offer stable internet connection throughout the country, and even more so in some rural areas. The degree of smart library's success will depend on the advancement in the internet infrastructure and the extent of spread of cheap and fast internet to the areas where it is not easily available.
- **Funding and Resources:** Some potential challenges for many libraries, especially in India, particularly in the rural or the financially constrained, could be high costs of applying the advanced technologies. A central challenge in implementing smart library projects will be sourcing sufficient funds for their funding and resources.
- **Data Privacy and Security:** The more data it accumulates from users through AI and big data, the more the question of privacy and security will emerge into scene. To ensure that the privacy of a user is well protected, libraries will have to apply what can be termed as rigid measures when data protection is concerned because the former will have to adhere to privacy laws.

7. Collaborative and Networked Libraries: In the future, Indian smart libraries will likely be a part of a complex networked library environment comprising libraries that are interconnected, share information, as well as practices. The inter library loan systems could become further developed into digital networks through which users can work on the resources of other libraries all over the country through cloud solutions.

It will be imperative that academic institutions, public libraries, and private organizations in the country develop the framework of a national knowledge system. It can let the Indian library gather all resources to score massive contract for digitizing rare books, articles

and other historical documents etc in its networked libraries, and to facilitate or increase the access to various kinds of specialized documents in different academic disciplines.

- 8. Sustainability and Green Technologies of the project:** As the smart libraries develop in India, the focus will shift to sustainability. Some of the specific uses that libraries can employ IoT devices include: Energy conservation; Control of the environment; Cutting down of expenses. Also, the smart libraries should embrace environmental friendly building designs and technologies that support the global goals of environmental conservation such as the use of renewable energy sources; sparing the use of paper and other physical materials.
- 9. Smart Libraries Knowledge Centre:** In the future, Indian smart libraries will stop being just the storehouses of knowledge, but they will become the knowledge centers created by the community. These shall act as outlets for learning, communication and ideas sharing among them. Libraries could organize special workshops, seminars or online conferences which will gather experts, researchers, and students...turn library from a mere consumption place into knowledge creation and social interaction environment.
- 10. Accessibility to Other Countries and Indian Information Sharing:** India is a treasure trove of cultural historical and smart libraries will have an important function to spread this great wealth all over the world. Preserving and converting India's rich culture, science and literature into digital form will help the country put its resources ready for use by other countries scholars and researchers. By leveraging cloud technologies and partnering with global institutions, Indian smart libraries could provide global access to unique resources such as ancient manuscripts, historical records, and traditional knowledge systems.

8. CONCLUSION

The transformation of libraries into smart libraries represents a significant leap toward modernizing the way people access, share, and engage with knowledge. In India, the integration of advanced technologies such as AI, IoT, cloud computing, and big data analytics holds immense potential to revolutionize educational and public library systems. These smart libraries will enhance user experiences, increase accessibility, and enable efficient resource management, bridging the gap between urban and rural areas.

While the future of smart libraries in India is promising, several challenges remain. Issues such as the digital divide, high implementation costs, data privacy concerns, and the need for continuous staff training must be addressed to ensure that the benefits of smart libraries reach all segments of the population. Moreover, ensuring robust digital infrastructure and promoting digital literacy will be essential to making smart libraries inclusive and accessible.

With government support, innovative partnerships, and a commitment to inclusivity, India is well-positioned to build a future-ready library system. Smart libraries will not only serve as repositories of knowledge but also as dynamic hubs for learning, collaboration, and innovation, ultimately contributing to the nation's progress toward a knowledge-based economy. By embracing the opportunities and addressing the challenges, India can create a new era of information accessibility, empowering its citizens and strengthening its role in the global knowledge ecosystem.

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Social Media and User-Centric Library Services

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Abstract

In the age of digital transformation, social media has become a powerful tool for libraries to enhance user-centric services. For libraries in India, embracing user-centric approaches through social media can lead to more effective communication and service delivery. This article explores how libraries in India are utilizing social media to offer better services to their users. By examining scientific libraries and their innovative approaches, we highlight some examples and case studies that demonstrate the impact of social media on library services. This article explores the impact of user-centric library services on scientific libraries, emphasizing how these services improve user engagement, resource accessibility, collaboration, and innovation. The focus is on improving accessibility, engagement, and user satisfaction through strategic use of social media platforms.

Keywords: Social Media, User-Centric Services, Indian Libraries, Scientific Libraries, Case Studies, Digital Transformation

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1. INTRODUCTION

In today's digital age, social media has become a vital tool for communication and engagement across various sectors. Social media has transformed various aspects of daily life, and libraries are no exception. Libraries, traditionally seen as repositories of books and knowledge, are increasingly adopting social media to enhance their services, reach a broader audience, and engage with their communities. Libraries, including scientific libraries in India, are increasingly using social media to connect with their users, enhance their services, and promote their resources. This article explores the reasons why social media is essential for libraries and how it can transform their operations and outreach. This article also discusses how social media platforms are being utilized to create user-centric library services in the Indian context, with a focus on scientific libraries. It also explores the various impacts of user-centric library services on libraries especially scientific libraries and their broader implications for scientific research.

2. SOCIAL MEDIA AND LIBRARIES

Social media has fundamentally altered the landscape of communication and information sharing across various sectors, including libraries. Its impact on libraries is profound, offering new avenues for engagement, outreach, and service enhancement. Social media platforms like Facebook, X, Instagram, ways to interact with their patrons. These platforms allow libraries to:



Fig. 1

2.1 Enhanced Communication

- **Immediate Updates:** Social media allows libraries to provide real-time updates about events, new arrivals, and changes in service hours. *For instance*, a library can quickly notify users about upcoming book sales, workshops, or temporary closures.
- **Two-Way Interaction:** Social media platforms facilitate direct communication between libraries and their users. Libraries can respond to queries, feedback, and comments promptly, fostering a more interactive and responsive service environment.

2.2 Increased Visibility and Outreach

- **Wider Audience Reach:** Social media extends the reach of libraries beyond their physical locations. By creating and sharing engaging content, libraries can attract and inform users who may not visit in person regularly.
- **Promotion of Services:** Libraries can use social media to highlight their services, such as digital resources, study programs, and community events. *For example*, a library might use Instagram to showcase new books or Facebook to advertise literacy programs. Libraries can also use social media to announce new services, upcoming events, and important updates. *For example*, the National Institute of Science Communication and Policy Research (NIScPR) in India uses 'X' to share news about their research, publications, and events.

2.3 Community Building

- **User Engagement:** Social media provides a platform for libraries to engage with their community through discussions, polls, and interactive content. This engagement can help libraries understand user needs and preferences better. *For Example:* The Indian Institute of Technology (IIT) Library at Bombay actively uses Instagram to post about new acquisitions and research highlights, encouraging student engagement.
- **Event Promotion:** Libraries can build a sense of community by promoting events such as author talks, book clubs, and educational workshops. Social media helps in generating buzz and increasing attendance for these events. *For example*, Central Secretariat Library, New Delhi uses social media platform for advertising their upcoming events like lecture, exhibitions, author meet etc.

2.4 Digital Literacy and Learning

- **Educational Content:** Libraries can share educational content and resources on social media, including research tips, reading lists, and informational articles. This content can help users develop digital literacy and improve their research skills.
- **Workshops and Training:** Social media can be used to promote and organize online workshops and training sessions, making it easier for users to access learning opportunities and improve their digital skills.

2.5 Feedback and Improvement

- **Gathering Insights:** Social media platforms offer valuable insights into user preferences and behaviors through likes, shares, and comments. Libraries can use this feedback to improve their services and tailor their offerings to better meet user needs.
- **Surveys and Polls:** Libraries can conduct surveys and polls via social media to gather opinions on various aspects of their services, such as new programs, resource needs, and user satisfaction.

2.6 Enhancing Library Collections

- **Showcasing Resources:** Libraries can use social media to highlight their collections, including rare books, new acquisitions, and special archives. This exposure can attract researchers and enthusiasts interested in specific topics.
- **Crowdsourcing Content:** Social media can be used to crowdsource information and materials for special projects or collections, such as local history archives or community-driven research initiatives.

Social Media and User-Centric Library Services in India

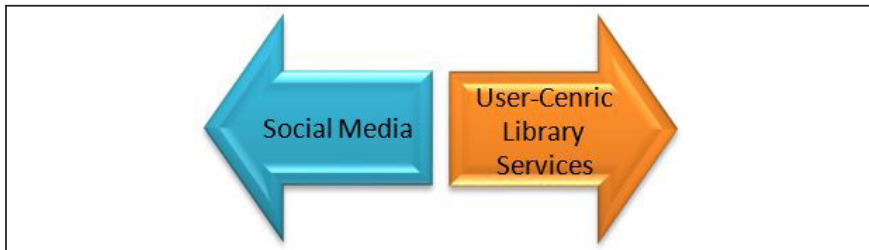


Fig. 2

User-centric library services are designed to prioritize and meet the needs of library users. These services are tailored to enhance user satisfaction, engagement, and accessibility. In the digital age, social media has emerged as a critical tool for libraries to deliver and improve these user-centric services. In libraries user-centric library services entail and how social media can be effectively used to enhance them.

2.7 User-Centric Library Services

User-centric library services focus on the needs, preferences, and behaviours of library users. Key aspects include:

1. **Personalized Assistance:** Tailoring services to individual user needs, such as providing custom research support or targeted information.
2. **Enhanced Accessibility:** Ensuring that library services and resources are easily accessible to all users, including those with disabilities or those who cannot visit in person.
3. **Engagement and Interaction:** Creating opportunities for users to interact with the library through various channels and participate in library events and programs.
4. **Feedback and Improvement:** Continuously gathering user feedback to improve services and address any issues users may encounter.
5. **Educational Support:** Offering resources and training to help users develop their information literacy and research skills.

2.8 Common User-Centric Services in Libraries

These are the common library services, where we use different social media in different ways keeping users at the centre:

- Document Delivery Services
- Virtual Delivery Services
- Sharing of Consortia based Resources Services
- Online Database Search and Retrieval Services
- Blogs and Wikis
- Email services

- Social Network Services
- Current Awareness Services
- Bulletin Board Services
- OPAC and WebOPAC Services
- Teleconference Services
- Webinars Services
- Video Conferencing Services
- Collaborative Discussion Forum Services
- Virtual Reference Services
- Interlibrary Loan on online and offline resources Services
- RFID Services
- CCTV services (issue based)

The above mentioned categories of services are commonly developed based on User needs. Having these services in your library, the centric, the library resources are then having best use and the users will be very satisfied.

The Role of Social Media in Enhancing User-Centric Library Services:

Social media platforms provide libraries with new ways to deliver and enhance user-centric services. Here's how they can be effectively utilized:

1. Personalized Assistance/ Reference Service

- **Real-Time Queries:** Libraries can use platforms like Twitter and Facebook to offer real-time responses to user queries. This allows users to get immediate assistance with research questions or access issues.
- **Chatbots and Automated Responses:** Libraries can implement chatbots on platforms like Facebook Messenger to provide 24/7 support for common queries and guide users to relevant resources.

Example: The **University of Delhi Library** uses 'X' to respond to student questions about library resources and services, providing personalized help and guidance.

2. Enhanced Accessibility

- **Virtual Tours and Tutorials:** Libraries can create and share virtual tours of their facilities and online tutorials for using their resources. This helps users who cannot visit in person to access library services remotely.

- **Inclusive Content:** Social media allows libraries to post content in multiple formats, including text, video, and audio, making it accessible to users with different needs.

Example: The **Indian Institute of Technology (IIT) Library in Bombay** offers video tutorials and virtual tours on YouTube, making their resources more accessible to a broader audience.

3. Engagement and Interaction

- **Interactive Content:** Libraries can engage users through interactive content such as polls, quizzes, and live Q&A sessions on platforms like Instagram and Facebook.
- **Event Promotion:** Social media is an effective tool for promoting library events, workshops, and book clubs, encouraging user participation and interaction.

Example: The **National Institute of Science Communication and Policy Research (NIScPR)** uses Facebook Live to host interactive sessions with researchers and experts, fostering user engagement.

4. Feedback and Improvement

- **Surveys and Polls:** Libraries can use social media to conduct surveys and polls to gather feedback from users about library services and programs.
- **Monitoring User Sentiment:** By tracking mentions and comments on social media, libraries can monitor user sentiment and address any issues or concerns promptly.

Example: The **Jawaharlal Nehru University (JNU) Library** uses Facebook polls to gather user feedback on new services and resource needs, allowing them to make data-driven improvements.

5. Educational Support

- **Resource Sharing:** Libraries can share educational content, such as research tips, reading lists, and information literacy guides, on social media to support user learning.
- **Online Workshops:** Social media platforms can be used to promote and conduct online workshops and training sessions on various research and information skills.

Example: The **Indian Statistical Institute (ISI) Library** shares research tips and educational resources on Instagram, helping users enhance their research skills and knowledge.

2.9 Impact on User-Centric Services

The integration of social media into library services has led to several positive outcomes:

- **Increased Accessibility:** Users can access information and updates from libraries anytime and anywhere, making services more accessible.
- **Enhanced Engagement:** Social media facilitates two-way communication, allowing libraries to receive feedback and engage in meaningful interactions with users.
- **Improved Visibility:** Libraries gain greater visibility through social media, attracting more users and showcasing their services and resources effectively.

2.10 Case Studies

1. Indian Pharmacopoeia Commission (IPC) Library

- **Approach:** IPC Library uses Facebook, WhatsApp and email services to update users with the latest information and provide various alerting and reference services. They also conduct surveys using google form to know users need.
- **Outcome:** Saved the user's time as they get the latest information on their related subject areas via email and Facebook. Users stay updated on library activities and new information.



Fig. 3

2. Indian Institute of Science (IISc) Library

- **Approach:** IISc leverages 'X' to share updates on new research publications, library events, and workshops. They also conduct surveys and polls to understand user preferences.
- **Outcome:** Increased interaction and feedback from the academic community, allowing the library to tailor its services more effectively.

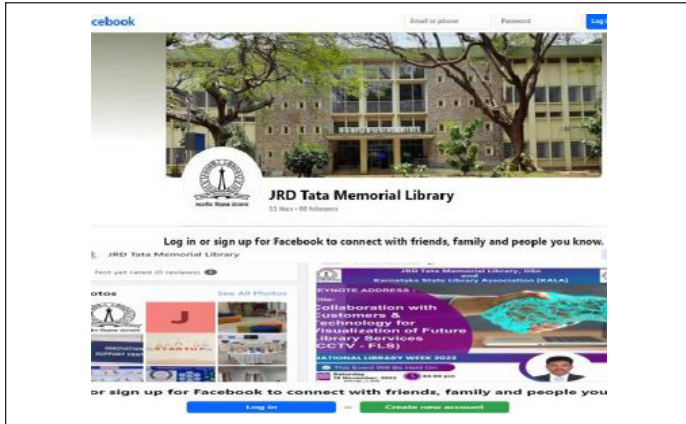


Fig. 4

3. National Institute of Technology (NIT) Tiruchirappalli

- **Approach:** NIT Tiruchirappalli utilizes Facebook and Instagram to host educational webinars and tutorials. They also promote their new resources and library services through engaging posts.
- **Outcome:** Enhanced user engagement and better utilization of library resources, with positive feedback from students and researchers.

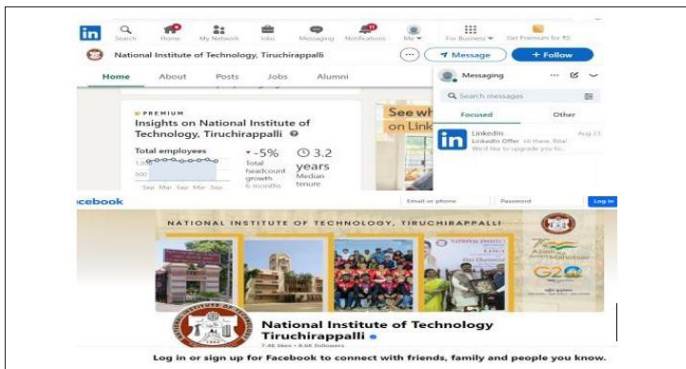


Fig. 5

4. National Institute of Molecular Biology and Biotechnology Library

- **Approach:** To help users keep up-to-date, NCBI produces the online NCBI News and offers RSS feeds and mailing lists, along with a presence on Facebook, 'X' and YouTube.
- **Outcome:** Increased direct interaction of users with the library and its services and keeping them updated about the new activities taking place in the institution through social media



Fig. 6

3. CONCLUSION

Social media is revolutionizing library services in India, especially in scientific libraries. By leveraging social media platforms, libraries can offer more user-centric services, enhance engagement, and improve accessibility. The Examples of some Institutions and Case Studies of Indian Institute of Science (IISc) Library, National Institute of Technology (NIT) Tiruchirappalli, and National Institute of Molecular Biology and Biotechnology Library highlight how libraries can effectively use social media to meet the needs of their users and adapt to the digital age. The shift towards user-centric library services is having a transformative effect on libraries. By enhancing user engagement, improving resource access, increasing collaboration, and fostering innovation, these services

are redefining the role of libraries in the research ecosystem. The findings highlight the growing importance of user-centric strategies in advancing scientific inquiry and supporting the research community.

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Transforming Services through Integrating Modern Technology and Increasing Digital Literacy by Introducing New Tools: A Case Study of IITM Library

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Abstract

Information is the key driver of today's knowledge-based economy. We are committed to transforming India into a 'Viksit Bharat,' a knowledge-driven nation by 2047. To realize this vision, every citizen must be digitally literate and skilled in advanced technologies to enhance their lives. This paper explores how the Library of Library Information and Publication division at IITM, Pune, has embraced modern tools and technologies to promote digital literacy within its scientific community. Since its establishment, the library has served as an essential resource. In the pre-digital era, its operations were manual, but the digital revolution has dramatically transformed its information collection and dissemination methods, positioning it as the institute's knowledge hub. The library has upgraded its services by utilizing technologies like library management software for lending services and knowledge organization. It uses digital library software like D-Space to preserve digital media coverage and archival video. It also fosters digital literacy through tools like Grammarly for grammar checks and i-Thenticate for plagiarism detection. Furthermore, the library creates and manages library portal and websites for various events, including conferences and seminars, which aid information sharing and science outreach and enhance the institution's visibility. Additionally, it helps produce short films and short videos using AI voice-over and animation tools, aiming to improve digital literacy and meet the needs of new users by presenting information in a contemporary format.

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Keywords: Digital library services, Digital literacy, Technology integration, Indian Institute of Tropical Meteorology, Knowledge Archives

1. INTRODUCTION

The government of India launched the Viksit Bharat Mission to achieve the goal of a developing nation towards a developed country in 2047. The government promotes modern technologies in every sector to foster changes at every stage. Technology has drastically influenced human life, as seen in our daily lifestyle. Technology helps us move towards a sustainable lifestyle, which primarily includes social well-being, which depends on education. Rapid technological enhancement is due to continuous research and development, which affects the education sector significantly. In the teaching and research sector, information and communication technology is helping in many ways. New technology-assisted learning tools such as mobile devices, smart boards, MOOCs, tablets, laptops, simulations, dynamic visualizations, and virtual laboratories have altered education and research in schools and institutions, respectively.

To make India a developed nation, it is necessary to make it a knowledge-driven economy in which information and knowledge are the key players, and information generation, dissemination, and management are the key works. Technology is going to help us in that way. A sustainable lifestyle is only achieved through proper information dissemination and its use, and libraries will play a significant role.

Earlier libraries behaved as storehouses for written materials and were limited to an elite group for use. Still, they slowly became open for all due to advancement and social change. Due to modern technological inventions, libraries are now accessible by anyone, from anywhere and at any time, making them flexible. Libraries are said to be an essential organ of any institute. In research institutes, libraries play a principal role in educating the educated. They give the way to future researchers through their effective and efficient services. IITM's library also behaves similarly.

IITM is a premium institute researching climate change and weather prediction, fostering a climate-resilient lifestyle. The library of the institute was established with the establishment of the institute in 1962, which required a separate building soon after an increase in collection and due to more information accumulation. The current building was constructed in 1996, and since then, it has been a primary knowledge center of the

institute. Over time, the library has also adopted some modern tools and techniques to assist its patrons and also help increase digital literacy among them.

2. REVIEWS OF PREVIOUS LITERATURE

In his article, Ganaie, S. A. (2013) stated how libraries are playing a critical role in increasing digital literacy in the higher education system in India. He states that information is crucial in increasing digital literacy, so librarians only manage it mannered. He highlighted the role and importance of libraries in higher education, elaborating on them as inseparable-indivisible concepts and underlining the fact that libraries are to educate the educated. The author also elaborates on the impact of ICT on changing the library from a storehouse to a knowledge center, which anyone can access anywhere at any time. The use of ICT tools in the library's day-to-day activities was also discussed. Some significant initiatives of the government of India to foster the integration of ICT with libraries like INFLIBNET, INDEST, etc., help libraries to grow more quickly. The effect of digital literacy, its mean uses, impact, and characteristics were discussed. The literature suggests that there is a need for more advancement in the professional skills of library professionals.

Disease, Oyigham, *et al.* (2023) elaborated on leveraging digital literacy for self-sufficiency among library professionals, discussing the information landscape's evolution and the role of library professionals in increasing digital literacy. Understanding the emerging technologies and using their potential efficiently in day-to-day work is explained. The role of LIS professionals in 21st-century libraries is also discussed. The need for digital inclusion and its effectiveness in providing better services to patrons is explained. Some skills include continuous learning, data management and analytics, AI and automation, digital resource curation, etc. The explanation of challenges associated with librarians' digital literacy for self-sufficiency was discussed, in which it states that with the rapid technological advancement, new tools, platforms, and software are continuously emerging, which makes a provocation for librarians to keep them up with the latest developments.

Wang, Chen, and Si Li (2024) examined the status of digital literacy and use of digital technology in Chinese libraries. The examination used the

term frequency-inverse document frequency (TF-IDF) technique for keyword extraction. They discussed the empowerment of sustainable development with the influence of libraries through the intersection of information access, digital inclusion, and different policy objectives. The study focuses on the role of libraries in promoting digital inclusion and literacy in education. To conduct this study, the data was collected from the Peking University database, and the analysis was done, approximately 20% of the total score, totaling 55 points out of a maximum of 300, which regards the evaluation criteria for libraries at different levels. A class-wise distribution of the libraries using different measuring criteria was done. They concluded that policymakers must foster coordination and collaboration among the various government agencies responsible for digital inclusion and literacy initiatives, expand local-level initiatives for digital inclusion and literacy, ensure equitable access, etc.

Das, Prodip (2024), in his article titled “Redefining College Libraries in Today’s ‘Digital India’: A Special Reference to the National Education Policy 2020,” investigated the impact of emerging digital technologies and the effect of the landscape of digital information in libraries. It also examined the implementation of NEP 2020 and its effects on traditional college libraries. The investigation concludes that libraries have transformed themselves, from services to collection development, building to library management, preservation and conservation of reading materials, and information retrieval. It shows the effect of NEP 2020 on college libraries, which use more digital resources than ever before.

3. MODERN TECHNOLOGY INTEGRATION

It integrates technology based on practices and resources into our daily routines, work, and management. The resources required for the integration are computers and specialized software, network-based communication systems, printers, and other equipment and infrastructure related to these. The integration has some prerequisites, like practicing collaborative work culture and communication, researching based on the internet, having remote access to instruments, having network-based transmission and retrieval of data, and other methods. It worked manually after establishing the institute’s library in its early days. Still, soon after

the increase in demand for different kinds of services, the library was among the first places where the PC was installed for the first time within the institute, and with the passage of time and newer needs, the library got its first library management software called CDS/ISIS which was distributed by UNESCO to developing nations for the better management of the library resources and its services. Again, due to the increase in need, libraries have been using newer and more advanced library management software called iSLIM for some years. In 2004, new and made India Library Management software called Lybsis was installed in the library to perform day-to-day work library work. Currently, the library uses the latest version of Lybsis (Lybsis-10), where the library performs all its day-to-day activities like Circulation (including book check-in, check-out, renewal, reservation, etc.), Cataloguing, Acquisition, Serials, OPAC, Stock verification, etc.

Integrating modern tools and technology makes library operations quick and fast and helps patrons easily retrieve information and disseminate it to the library staff. There are many different operations of the library where the library uses modern technology for acquisition; the library collects the recommendations in both online and offline manners and places the order to the vendor through email; after the purchase, library professionals use the LMS to create digital records of the purchase for easy retrieval. Online cataloging service in which there is no need to develop the physical catalog card for the book while entering the records in the system, the online record is generated which can provide the whole bibliographical details about the physical collection; the OPAC service gives us the correct location of the physical collection of the library and also save the time of user and staff. The technology is beneficial in the sense of reference services because anybody who wants any reference service in physical mode will take a long time to respond. Still, due to modern technology, it is easy for reference librarians to provide users with a quick and fast reference service. One more critical service that the library offers is document delivery service, in which technological development has played a crucial role; with the help of technology, we can ask for or respond to document delivery services to anybody at any time as needed. The recent development has made resource sharing more accessible and faster; with the help of technology, it has made the development of consortia to foster resource sharing, which can help in research.

Table 1

S. No.	Library Operations and Services	Traditional Methods	Digital Technologies
1.	Acquisition of information resources	Paper-based writing/typing	Digital selection of information resources using online recommendation and ordering through library automation software, Audio/video resources compilation
2.	Organization of Information	Accessioning, Classification	Using collaborative resources like Z 39.50, electronic data processing and data entering in LMS, Artificial Intelligence / Expert system
3.	Information Retrieval	Catalogs, bound volumes, and Indexes	OPAC (Online Public Access Catalogue), Web OPAC, Database Management system, Information Retrieval through offline and online mode
4.	Information dissemination	Check-in, check-out, renewal with manual library card, book card, due date lists, bibliographies, Abstracts, Hardcopies	Library website, automated issue, return, and renewal systems, online catalog cards, subject guides for bibliographies, databases for abstracts, computer conferencing, Telefacsimile
5.	Reference services	Paper-print media, Reference books	Scholarly databases, E-books, e-journals, resource sharing through collaboration, digital information gateways
6.	Curation and Preservation of Information	Manuscript, Paper-Print Media, use of chemical agents physically	Document scan and converting it in electronic form, use of new repository software for archival management, and use of nitrogen and carbon dioxide for preservation of physical materials, magnetic tape, CD-ROM, DVD
7.	Inter-library loan	Paper-based Document Delivery	Formation of consortia for easy delivery of information and documents, Common communication format
8.	Removal of information resources	Physical weeding out	Magnetic Erasers, Optical Erasers, Re-use of Medium

The institute's library is undergoing considerable transformational change due to the inclusion of cutting-edge technologies; the library is familiarizing itself with various new techniques and technologies, including bibliographic reference management software, electronic rights management systems, classroom management systems, and electronic resource management software. Knowledge plays a vital role in the adoption of modern technologies. Integrating contemporary technology in the library necessitates acquiring the required skills to operate the global information community and increase its footprints.

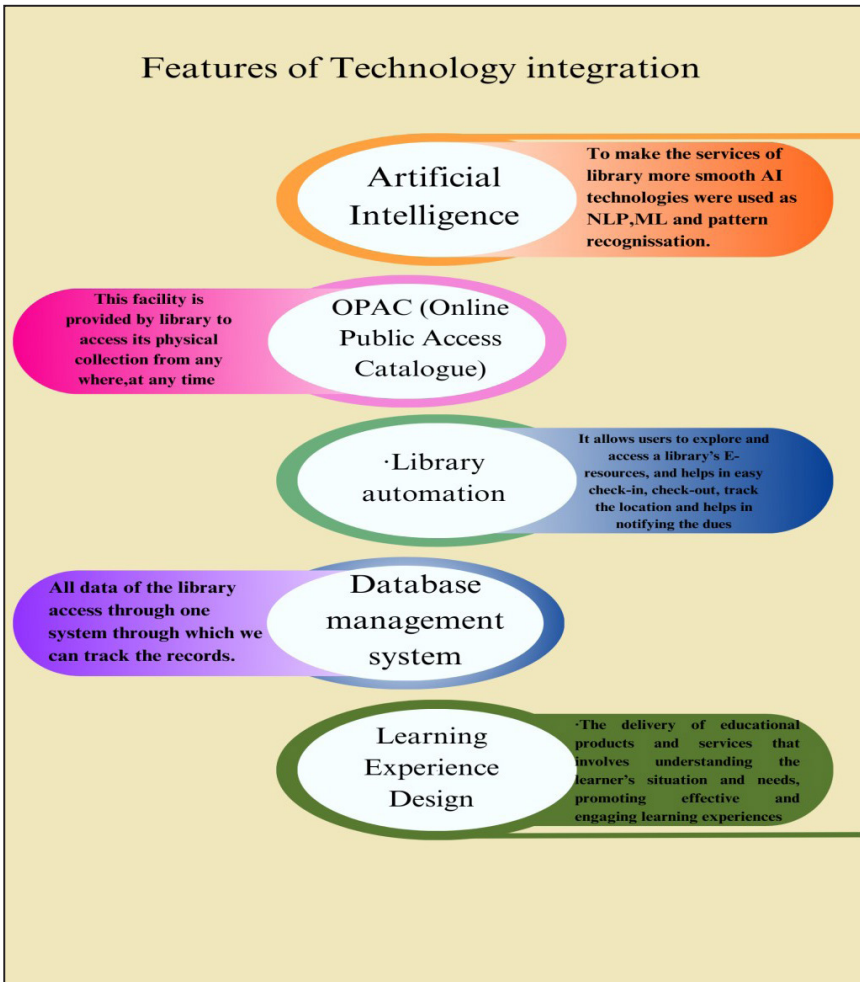


Fig. 1

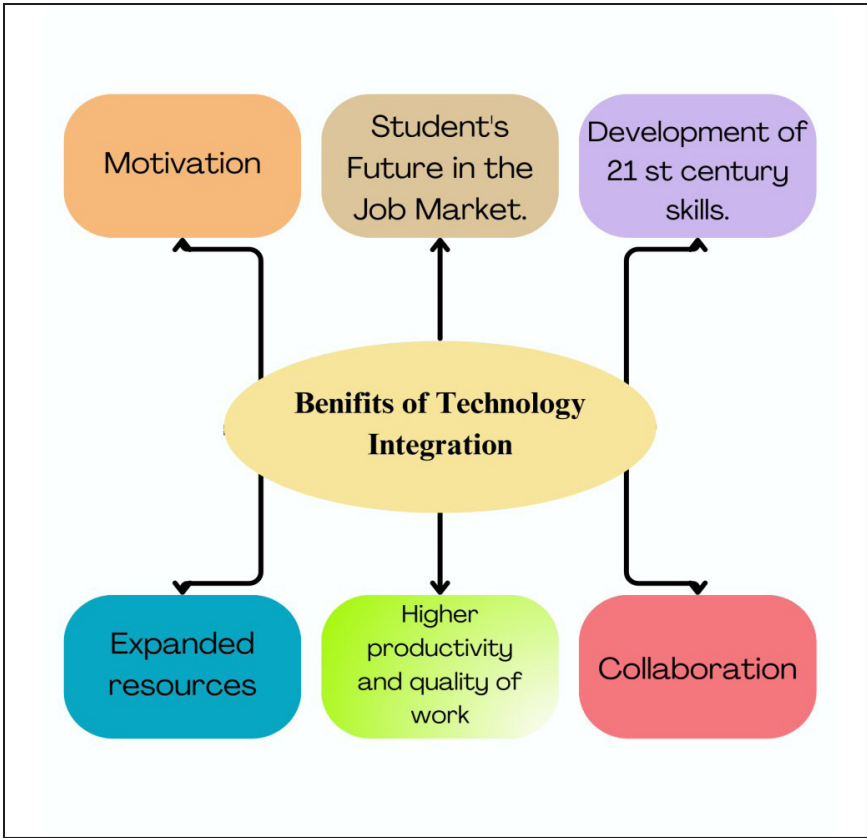


Fig. 2

4. DIGITAL LITERACY

Digital literacy refers to the ability of a person to understand and use digital technologies for meaningful actions and communicate them. It imparts ICT skills relevant to the students' needs, enabling them to use IT and related applications. Digital literacy has brought about tremendous positive changes in all spheres of life, whether the individual's education, the societal economy's development, or technological advancement. Some aspects of digital literacy are the power of the internet, use of apps, use of browsers, ethical use of the internet, threats of cyber security, etc.

The equation to define digital literacy is represented as:

Digital literacy = Digital Tool Knowledge + Critical Thinking + Social Engagement.

There are mainly four dimensions of digital literacy mentioned as:

Operational: It refers to the ability to use modern technologies like computers and communication tools.

- **Semiotic:** The ability to converge multimedia universe using all languages
- **Cultural:** the information society with a new intellectual environment
- **Civic:** In the context of new technologies, the formation of a newer repertoire of rights and duties

In the present era of digital transformation, it is necessary to know about the fast-changing technology for which the government of India initiated the Digital India mission to make India a leading nation in the digital world. On this note, the government has launched nine significant projects as part of the digital program: E-Governance, E-Kranti, Broadband Highways, Public Internet Access Program, electronics manufacturing, etc. The initiatives regarding digital technologies and resources are creating consortia for easy access to digital learning materials, promoting open access movement, creating digital repositories, etc.

5. ROLE OF IITM LIBRARY IN INCREASING DIGITAL LITERACY

Institutions' libraries provide easy access to the information in any format. They have tried their best to update their-self by adopting the latest technologies, ensuring the easy accessibility of information to the patrons. They make users well aware of the different sources and formats of information. The Indian Institute of Tropical Meteorology's (IITM) library also helps its patron achieve research-oriented digital literacy. It provides information about how to use research writing aids, such as Grammarly, and how to give queries in extensive databases for easy information retrieval. Web of Science, how to generate citations using different citation generator tools, ex. Mendeley and many more. The library disseminates valuable information through its website, which the library professionals of the institute develop. It provides the previous thesis and dissertations completed by institute researchers in digital format. The publications of the scientists of the institute from 1964 to the present are compiled by the library professionals and presented in the form of the in-house built repository. The repository provides information about the productivity of the institute and its scientists; it shows what kind of journal titles IITM scientists use to publish their publications with their impact factor.

6. ROLE OF LIBRARY PROFESSIONALS IN THE 21ST CENTURY

In the 21st century, library professionals are no longer the gatekeepers of the physical collection of libraries; now, they are regarded as the navigators of information in this digital age. The professionals are responsible for many roles as they must provide different services to their patrons. Some roles and responsibilities are discussed as follows:

- **Digital Resource Managers:** For the accumulation and distribution of digital collections such as e-books, e-journals, online database management, multimedia resources
- **Information Retrieval with Resource and Network Services:** Retrieval information from various sources without visiting the library environment and providing effective search strategies to patrons to access quality digital information efficiently.
- **Digital Reference Services:** Thorough virtual presence assists users in convenient access to needed resources in digital format.
- **User Services and Digital Literacy Instruction:** To provide users with quality services that will aid learning capacities, promote communication, build knowledge, and influence good decision-making, offering workshops and training sessions to improve patrons' digital literacy skills.

7. CONCLUSION

The rapid increase in technological development has changed the scenario for library professionals, who now have to address the patron's current needs and be alert and aware of these changes. AI, data analytics, digital resource management, and curation have transformed the professional landscape. Now, they can achieve the self-sufficiency to perform these roles through digital literacy.

The IITM library professionals are also preparing to leverage this task by continuous training and attending professional development programs focused on content creation, design, web page and website designing, new software for library upgradation, digital news coverage, ease of information access, etc.

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Online Presence of Faculties at Dr. R.P. Centre for Ophthalmic Sciences AIIMS, New Delhi: A Google Scholar Visibility Study

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Abstract

This research explores the online presence of faculty members at Dr. R.P. Centre for Ophthalmic Sciences, specifically focusing on their Google Scholar profiles during their tenure at AIIMS, New Delhi. On August 07, 2024, a thorough manual investigation was conducted on Google Scholar, utilizing the faculty's precise names and institutional affiliations. The findings revealed that 53.15% of Dr. R.P. Centre faculty members actively maintain Google Scholar profiles. Notably, Dr. Namrata Sharma, a luminary in ophthalmology, claims the top position with a remarkably distinguished figure of 904 publications. Impressive citation count of 16,205 and notable h-index of 64 takes the lead with an i10-index of 236.

This study underscores the dual utility of Google Scholar profiles, serving as a valuable tool for evaluating individual and institutional research achievements. The consolidation of research output into a single platform significantly enhances accessibility. Faculty members are encouraged to strategically emphasize their areas of expertise strategically, thus bolstering their visibility and fostering collaborations with like-minded peers, both domestically and internationally.

Keywords: Online Research Visibility, Digital Visibility, Dr. R.P. Centre faculty. AIIMS, New Delhi. Google Scholar metrics.

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1. INTRODUCTION

Our nation's prosperity and contributions to humanity are closely tied to the research initiatives of academic educational institutions, focusing on development and innovation. This is an ongoing and frequent endeavour to cultivate a more advanced knowledge society. A national health research strategy should prioritize quality, focused research, and increased productivity.

A researcher's professional portfolio encompasses a wealth of information, including publications, participation in conferences, collaborative learning, educational responsibilities, research endeavours, data collection, and various other research-related activities. A researcher's profile serves as a gateway to their work, enhancing the accessibility of their scholarly contributions across diverse platforms and networks. It simplifies the process for users to locate editorial and publisher content.

Google Scholar is a convenient and efficient tool for accessing research articles related to specific researchers. Google Scholar Profiles offers authors a straightforward method to showcase their academic publications, visualize citation trends over time, and automatically calculate and update various citation metrics online. Through Google Scholar, authors can enhance the visibility and global impact of their recent scholarly works using Google Scholar Metrics. This freely available academic database search service empowers users to explore scholarly research across various academic disciplines, providing access to full-text documents and metadata from sources such as books, conference proceedings, articles, reports, theses, and online repositories.

This paper places particular emphasis on the profiling function of Google Scholar. By creating a personal account and adding intellectual content, researchers can amplify the reach and influence of their research output. Google Scholar Profiles consistently monitor and display key metrics such as citation counts, h-indices, and i10-indices, thereby elevating the visibility of researchers. This paper delves into the online research presence of faculty members at Dr. R.P. Centre for Ophthalmic Sciences(RPC), AIIMS in New Delhi, highlighting the citation metrics available on their Google Scholar profiles. It underscores the potential for author publications to explore research areas, fostering greater accessibility to a researcher's work.

2. REVIEW OF LITERATURE

In the existing body of literature, several studies have delved into the critical theme of online research visibility and its connection to academic

productivity and recognition. Here, we summarize and reiterate the key findings from these studies to provide a comprehensive overview of this research domain:

Parida *et al.* (2020) conducted a comprehensive review of national and international literature, focusing on research papers by scientists and health professionals. The collaboration between departments and faculties within medical education institutions was identified as a strategy to boost research visibility, credibility, prestige, and overall productivity. Adriaanse and Rensleigh (2017) emphasized the importance of online representation for researchers and linking online research to enhance their visibility. This linkage is instrumental in increasing the visibility of scholarly articles. Goldenfein and Griffin (2022) emphasized the role of citation count in research visibility, particularly through Google Scholar, as it regulates communication among academics, academic supervisors, and repositories. Patra and Ray (2018) focused on the expansion of medical services and their significance for healthcare institutions, with faculty members playing a role in suggesting approaches to increase the visibility of scholarly work at a national level.

Mikki *et al.* (2015) explored academic profiling websites and their relationship with user actions, such as publications and citation metrics, emphasizing advanced techniques to increase researcher exposure. Lateef *et al.* (2016) evaluated African researchers' effectiveness and online exposure using Google Scholar Citation, highlighting its role in assessing and enhancing research productivity and visibility.

Francke (2019) explored how authors use information technology for online visibility, especially through scholarly research online profiling portals, to connect with other researchers and improve the visibility of their research. Gasparyan *et al.* (2017) highlighted using specific tools for sharing scholarly content and connecting scholars on popular profile websites and global bibliographical databases. Ali and Richardson (2019) investigated the impact of Google Scholar metrics on the profiles of Pakistani LIS researchers, using metrics such as publications, citations, h-index, and i10-index to measure research impact. Maurya *et al.* (2019) studied the research performance of LIS faculties based on Google Scholar, noting the productivity and impact of specific faculty members with highly cited publications. Kjellberg and Haider (2019) investigated how researchers use online digital communication platforms to enhance their visibility, focusing on platforms like Academia, Research Gate, and Mendeley.

Rekha and Rupesh (2019) examined the impact of citation counts on academic organizations, highlighting the role of Mendeley and Google Scholar in affecting readership and citation counts. Kim and Grofman (2020) pointed out the significance of citation counts and researchers' profiles, with Google Scholar Profile being a user-friendly and comprehensive tool. Khan and Soomro (2021) emphasized the importance of scholarly profiles on websites for publication and evaluating collaborative academic networks. Google Scholar profiles were considered reliable for this purpose. The existing literature provides valuable insights into online research visibility.

The review needs to identify a gap in the comprehensive analysis of citations and ranking of faculty members, including metrics like the h-index, i10 index, total publication counts, and total citation counts. This study addresses this gap and analyses Dr. R.P. Centre Ophthalmic Sciences faculty members' rankings and research impact.

3. STATEMENT OF THE PROBLEM

The primary objective of this study encompasses the demonstration of the value of a digital platform, along with the evaluation of the online presence of Dr. R.P. Centre for Ophthalmic Sciences, its faculty members, and their research profiles on Google Scholar. The research entails a comprehensive examination of their Google Scholar profiles to gauge their research productivity, establish a ranking system for the Dr. R.P. Centre for Ophthalmic Sciences faculty, and enhance the accessibility of their research articles. The investigation suggests that higher education institutions should identify areas of expertise to facilitate collaboration and knowledge exchange among Indian and international academics with similar research interests. The ultimate objective is to equip each faculty member with essential insights and information to enhance their Google Scholar profiles.

4. OBJECTIVES AND METHODOLOGY

- (i) To determine the Google Scholar presence of faculty members associated with Dr. R.P. Centre for Ophthalmic Sciences
- (ii) To collect data on the total publications, citations, h-index, and i10 Index from the Google Scholar profiles of the faculties within the Dr. R.P. Centre study group.
- (iii) To establish rankings for Dr. R.P. Centre faculty members based on their Google Scholar metrics.

The study employed the “Observation Method” using the Google Scholar database. Data on the online profiles of faculty members associated with Dr. R.P. Centre was manually collected from their respective profiles on Google Scholar. All relevant details were accessed from the AIIMS, New Delhi website, ensuring accuracy in name and affiliation.

The study focused on 52 faculty members affiliated with Dr. R.P. Centre, a special centre at AIIMS, New Delhi, as of August 07, 2024, during the observation period, as outlined in Appendix I. The geographical scope of this research encompassed New Delhi. Data collection occurred in July 2024 and was updated on August 07, 2024. Data analysis was carried out in September 2024. Responses obtained from the online profiles of the participants were subjected to analysis through statistical techniques; including descriptive statistics conducted using MS Excel 2019.

5. DATA ANALYSIS AND INTERPRETATION

5.1 Research Visibility on Google Scholar

Comprehending the quality and reliability of Google Scholar (GS) is paramount, particularly as it increasingly establishes itself as a prominent, freely accessible source for scholarly literature retrieval (Table 1).

Table 1: Dr. R.P. Centre Faculties Profiles on Google Scholar

S. No.	Name of the Department	Total Faculty Members	Visibility on Google Scholar (%)	Visibility Not on Google Scholar (%)
1.	Ophthalmology	34	19 (55.88%)	15 (44.12%)
2.	Ocular Biochemistry	02	01 (50%)	01 (50%)
3.	Ocular Microbiology	02	02 (100%)	00 (0%)
4.	Anaesthesiology	04	01 (25%)	03 (75%)
5.	Ocular Pharmacology	02	02 (100%)	00 (0%)
6.	Community Ophthalmology	03	03 (100%)	00 (0%)
7.	Ocular Pathology	02	02 (100%)	00 (0%)
8.	Radio Diagnosis	01	00 (00%)	01(100%)
9	Investigative Laboratory	01	00 (00%)	01(100%)
10.	Hospital Administration	01	00 (00%)	01(100%)
	Total	52	30 (55.77%)	22(44.23%)

Table 1 illustrates the departmental composition at Dr. R.P. Centre, highlighting key insights into faculty engagement in research activities of the 10 departments comprising 52 faculty members, 30 individuals (55.77%) have a notable presence on Google Scholar, signifying a robust research culture. The Ocular Microbiology 100%, Ocular Pharmacology 100%, Community Ophthalmology 100%, and Ocular Pathology 100% department follows closely, showcasing a commendable research culture with 100% of its total 09 faculty members of all four departments featured on Google Scholar. Similarly, Ophthalmology demonstrates active research involvement, with 55.88% of its 19 of 34 faculty members visible on Google Scholar. Notably, the Ocular Biochemistry department is outrivaled in research engagement, with 50% of their 02 faculty members actively represented on Google Scholar. This highlights their strong commitment to scholarly activities and vibrant research culture, which indicates limited research visibility and a need for increased research engagement. In contrast, the Department of Anesthesiology has only 04 faculty members to catch up in research visibility, as only 25% are featured on Google Scholar.

Furthermore, the Radio Diagnosis and Investigative Laboratory department has only one faculty member in each department, but they must not be represented on Google Scholar, indicating minimal online research presence. Similarly, the Hospital Administration department, with one faculty member also not represented on Google Scholar, needs more representation on Google Scholar, underscoring its limited research engagement.

5.2 Google Scholar Metrics Visible on the GS Profile

Google Scholar metrics offer authors a convenient means of promptly assessing the impact and reach of their recent scholarly articles. Appendix I presents metrics data, including total publications, citations, the h-index, and the i10 Index. Additionally, we contacted faculty members who provided email addresses for verification, which serves as an institutional ID. Notably, 55.77% (30) of the faculty members have linked their names to institutional IDs and delineated their medical subject specialization areas on their Google Scholar profiles.

Appendix I further illuminates that 42.85% (12) have successfully verified their institutional email IDs, while 57.15% (16) of respondents have yet to confirm their official email addresses. Such verification is

pivotal for faculty members seeking to enhance their online research visibility. Notably, Appendix I also brings to light that 46.15% (24) of respondents have not established their Google Scholar profiles, resulting in the unavailability of their research metrics data, which includes total publications, total citations, the h-index, and the i10 Index due to the absence of profile pages on Google Scholar.

5.3 Top 5 R.P.Centre faculties based on the Highest Publication Count

The publication count represents the cumulative number of publications for each researcher.

Table 2: Top 5 Dr. R.P. Centre for Ophthalmic Sciences Faculties based on the Highest Number of Publications

Rank	Name of the Faculty	Department	Publications
1.	Dr. Namrata Sharma	Ophthalmology	904
2.	Dr. RohitSaxena	Ophthalmology	699
3.	Dr. Jeewan Singh Titiyal	Ophthalmology	510
4.	Dr. Tanuj Dada	Ophthalmology	477
5	Dr. Tushar Aggarwal	Ophthalmology	400

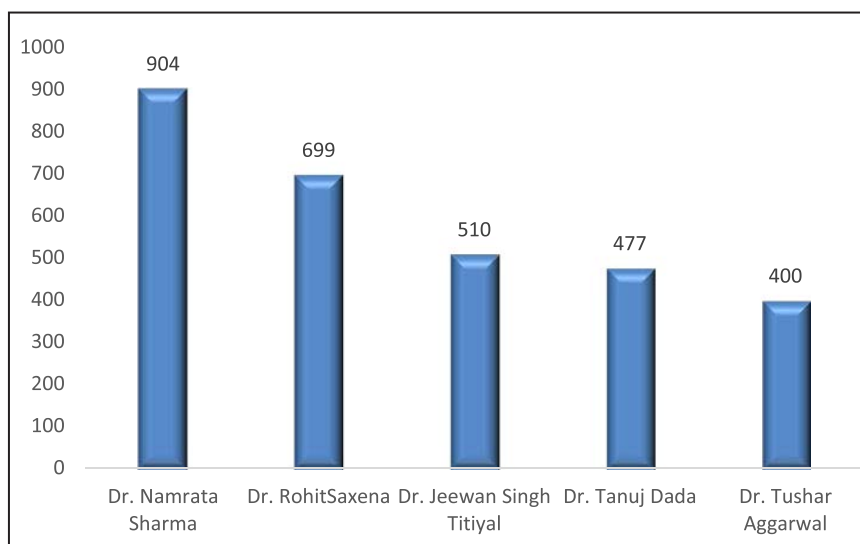


Fig. 1: Top 5 Dr. R.P. Centre for Ophthalmic Sciences Faculties based on the Highest Number of Publications

Table 2 presents the top 05 faculties from Dr. R.P. Centre at AIIMS, New Delhi, ordered in descending fashion according to their highest publication counts. Dr. Namrata Sharma claims the top position with a staggering 904 publications in the field of ophthalmology. This remarkable figure underscores his extensive and prolific research output, emphasizing his profound impact on the academic community within this specialized domain. Dr. Rohit Saxena closely followed as the second-ranking faculty member, with an impressive 699 publications in ophthalmology. His substantial publication count is a testament to his noteworthy research endeavours and profound Medical Oncology expertise. Dr. Jeewan Singh Titiyal secured the third position with 510 publications in ophthalmology. Her extensive publication record reflects her active and substantial involvement in research, particularly in the context of anesthesiology within the domain of Oncology. Dr. Tanuj Dada specializes in Ophthalmology and has contributed to 477 publications. While his publication count may be somewhat lower than that of certain peers, it nonetheless underscores his significant research presence and influence.

Interestingly, Dr. Tushar Aggarwal secured the fifth position with 400 publications in ophthalmology. Although some of his colleagues may surpass his publication count, it still underscores his noteworthy contributions to ophthalmology.

5.4 Top 5 Dr. R.P. Centre Faculties based on the Highest Citation Count

The citation count is calculated by how many other articles cite a particular publication. Google Scholar has a feature that automatically tracks the highest number of citations. There is a lot of difference in Google Scholar metrics between studied faculty members; five ranked studied faculty members are presented in Table 3.

Table 3: Top 5 Dr. R.P. Centre Faculties based on the Highest Number of Citations on Gs

Rank	Name of the Faculty	Department	Citations Count
1	Dr. Namrata Sharma	Ophthalmology	16205
2	Dr. Tanuj Dada	Ophthalmology	9583
3	Dr. Rohit Saxena	Ophthalmology	8824
4	Dr. Jeewan Singh Titiyal	Ophthalmology	8386
5	Dr. T. Velpandian	Ocular Pharmacology	5438

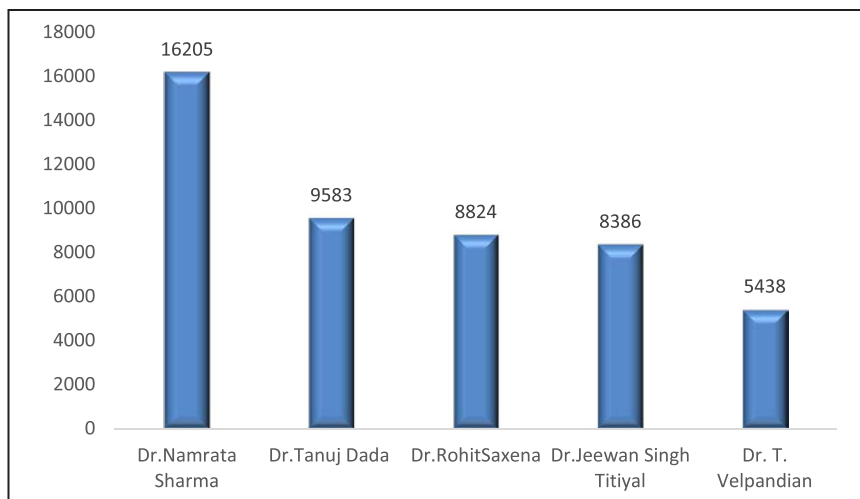


Fig. 2: Top 5 Dr. R.P. Centre Faculties based on the Highest Number of Citations on Google Scholar

Table 3 provides data on the top 05 faculties of Dr. R.P. Centre Ophthalmic Sciences (RPC), AIIMS, New Delhi, ranked based on the highest citation counts for their research. Dr. Namrata Sharma takes the lead with an impressive 16,205 citations in the field of Ophthalmology. This substantial citation count reflects her work's wide spread recognition and influence in this specialized area, underscoring her significant impact on the academic community. Dr. Tanuj Dada secured the second position with a notable 9,583 citations in the field of Ophthalmology. His substantial citation count highlights the extensive recognition of her research efforts and expertise in ophthalmology. Dr. Rohit Saxena ranks third with 8,824 citations in the realm of ophthalmology. His impressive citation count indicates the significant impact of her research in Ophthalmic Sciences, particularly within the context of. Dr. Jeewan Singh Titiyal holds the fourth position with 8,386 citations. His substantial citation count emphasizes the recognition of his contributions to the field of Ophthalmology.

However, Dr. T. Velpandian secured the fifth position with 5,438 citations in ocular Pharmacology. While his citation count may be lower than some peers on the list, it still highlights the impact of his research within this specialized field. The data in Table 3 spotlights the substantial impact and recognition of these top 05 faculties at Dr. R.P. Centre, particularly in Ophthalmology and Ocular Pharmacology. Their high citation counts underscore the influence and importance of their research contributions in these areas.

5.5 Top 5 DR. R.P. Centre Faculties based on the Highest Number of h-Index on GS

The h-Index gauges the significance, influence, and overall impact of a scientist's collective research contributions.

Table 4: Top 5 Dr. R.P. Centre Faculties based on the Highest Number of H-Index

Rank	Name of the Faculty	Department	h-Index Count
1	Dr. Namrata Sharma	Ophthalmology	64
3	Dr. Tanuj Dada	Ophthalmology	51
3	Dr. Jeewan Singh Titiyal	Ophthalmology	50
4	Dr. RohitSaxena	Ophthalmology	49
5	Dr. T. Velpandian	Ocular Pharmacology	39

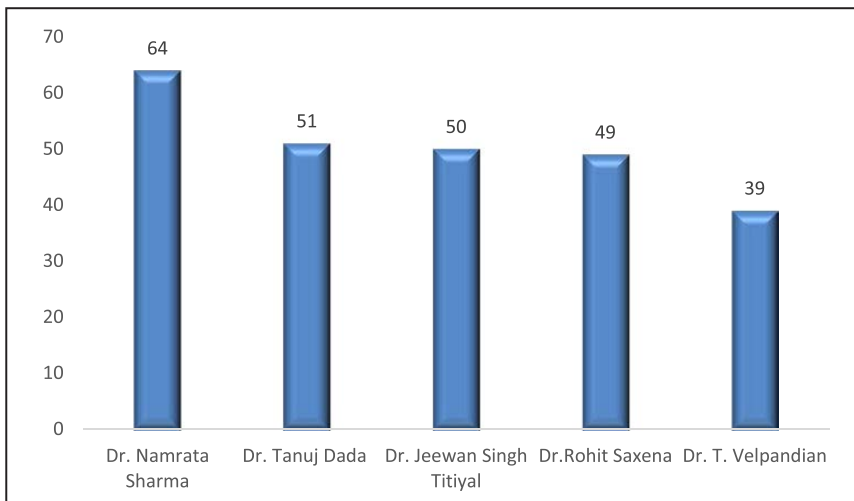


Fig. 3: Top 5 Dr. R.P. Centre Faculties based on the Highest Number of h-Index

Table 4 presents data on the top five faculties at Dr. R.P. Centre Ophthalmic Sciences based on the highest number of H-Index. H-Index is a metric that quantifies the impact of a researcher's work based on the number of citations their publications have received. Dr. Namrata Sharma holds the top rank in this list with an impressive H-Index of 64. This suggests that his work in ophthalmology had a significant impact and is widely cited in the academic community. Dr. Tanuj Dada ranks second in terms of H-Index, scoring 51. His work in ophthalmology is also highly influential, though slightly lower than that of Dr. Namrata Sharma.

Dr. Jeewan Singh Titiyal is in the third position with an H-Index of 50. His contributions to Onco-Anesthesiology are substantial and have been widely cited. Dr. Rohit Saxena holds the fourth position with an H-Index of 49. His work in ophthalmology is also notable, though somewhat lower than the top three researchers. Dr. T. Velpandianis in the fifth position with an H-Index of 39, closely following Dr. Garg. His contributions to the field of Ocular Pharmacology are significant, even though his H-Index is slightly lower than the researchers ranked higher.

5.6 Top 5 Dr. R.P. Centre (RPC) Faculties based on their i10 Index

The “i10-index is used only in Google Scholar, which is the number of publications with atleast ten citations, and Google introduced it in 2011”. Table 5 presents the highest i10 Index of Dr. R.P. Centre faculties.

Table 5: Top 5 Dr. R.P. Centre (RPC) Faculties based on the Highest Number of i10-Index

Rank	Name of the Faculty	Department	i10-Index Count
1	Dr. Namrata Sharma	Ophthalmology	236
2	Dr. Jeewan Singh Titiyal	Ophthalmology	205
5	Dr. Tanuj Dada	Ophthalmology	195
4	Dr. RohitSaxena	Medical Oncology	176
5	Dr. T. Velpandian	Ocular Pharmacology	122

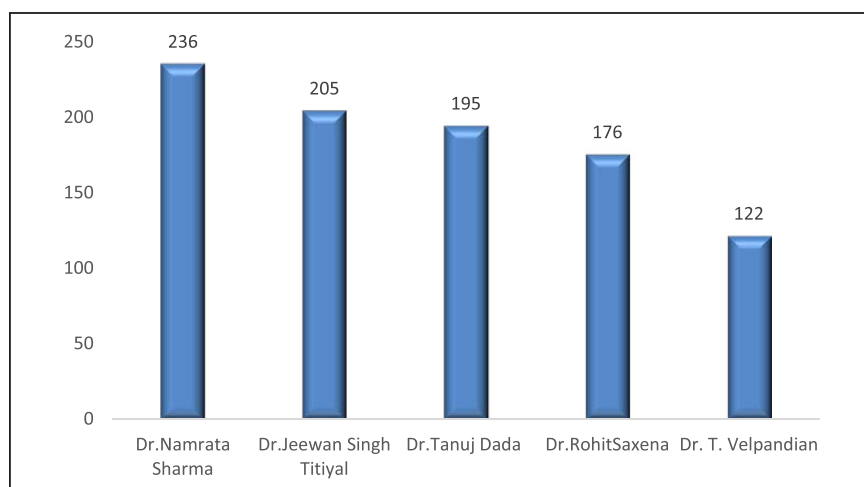


Fig. 4: Top 5 Dr. R.P. Centre (RPC) Faculties based on the Highest Number of i10-Index

Table 5 provides information about the top 5 faculties at Dr. R.P. Centre Ophthalmic Sciences based on their i10-Index counts, which measure scholarly impact. Dr. Namrata Sharma holds the first rank with an i10-Index of 236 in Ophthalmology at Dr. R.P. Centre (RPC). This score indicates a significant scholarly impact, suggesting that his research and publications have been highly influential and widely cited within the academic community. He is a prominent figure in the field. Dr. Jeewan Singh Titiyal is the second-ranked faculty member and works in the Department of Ophthalmology. Her i10-Index of 205 reflects a strong scholarly impact, indicating that other researchers have recognized and cited her work. She is a significant contributor to ophthalmology.

Dr. Tanuj Dada, also in the Department of Ophthalmology, ranks third with an i10-Index of 195. While her score is lower than Dr. Jeewan Singh Titiyal's, it still signifies a substantial scholarly impact. Her research has been acknowledged and cited by peers, demonstrating her contribution to the field. Dr. Rohit Saxena, specializing in Ophthalmology, holds the fourth position with an i10-Index of 176. Although his score is lower than the top three, it indicates a noteworthy scholarly impact. His research has made a valuable contribution to ophthalmology.

Dr. T. Velpandian, who works in the Department of Organic Pharmacology, is the fifth-ranked faculty member with an i10-Index of 122. While his i10-Index is the lowest among the top 5, it still suggests that his work has been cited and impacted the Ocular Pharmacology field.

6. DISCUSSION

Google Scholar is a free and user-friendly platform that offers access to various scholarly literature. Its profiling tool, Google Scholar Profiles, enables researchers to display their academic work, track citation trends, and manage key metrics like the h-index and i10-index. This tool enhances the visibility and reach of a researcher's work across the global academic community. The study analyzed Google Scholar data for faculty members at Dr. R.P. Centre for Ophthalmic Sciences, AIIMS, New Delhi. Table 1 revealed active research involvement across departments, indicating the need to improve visibility in areas like Ophthalmology. These insights can inform decisions on targeted support and resource distribution. Table 2 presents five leading faculty members with outstanding publication records, especially in Ocular Pharmacology. Their achievements reflect dedication and strong academic impact. Table 3 further highlighted the global recognition of these researchers, underscoring the significance of their contributions to Ophthalmology and related fields.

According to Hirsch and Buéla-Casal (2014), the h-index measures a researcher's influence within their scientific domain. Table 4 showcased top faculty based on h-index, led by Dr. Namrata Sharma, whose widely cited work signifies notable contributions to Ophthalmology. The range of h-index values (29–46) indicates high academic influence. Table 5 analyzed the i10-index scores, again emphasizing the dominance of Ophthalmology and Ocular Pharmacology. These metrics confirm the strong research performance of faculty and offer guidance for future institutional collaborations, performance assessments, and strategic planning.

7. CONCLUSION

This study highlights how researchers can use tools like Google Scholar and its citation profiles to enhance their online visibility for free. Faculty members who actively manage their profiles tend to achieve greater digital presence. Key strategies include digitizing research outputs and integrating them into online academic platforms. Faculty profiles were assessed for visibility and accuracy at Dr. R.P. Centre for Ophthalmic Sciences, AIIMS, New Delhi. While automatic updates in Google Scholar profiles are convenient, misuse can distort citation metrics. Researchers are advised to review and correct their profiles to ensure accuracy manually.

Faculty should publicize their profiles, including photos, verify affiliations with official emails, and link with co-authors to maximize online impact. These actions increase credibility and visibility. The study revealed that the Medical Oncology faculty had the highest number of publications, citations, h-index, and i10-index, reflecting significant research impact. The Ophthalmology department had the most prominent presence on Google Scholar. These findings emphasize the value of targeted academic visibility, which can lead to wider recognition and collaborative opportunities across disciplines and borders.

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Appendix-I: Metrics of Dr. R.P. Centre (AIIMS, Delhi) Faculty Profiles on Google Scholar

Name of the faculty Publications Count, Citation counts, h-index, i10 index, and Email for verification.

S. No	RPC List of Faculty Members			GS Profile Status		Publications and GS Metrics			
	Name	Designation	Department	GS Profile	Verified Email	No of Publications	Citations	H-Index	i-10 Index
1	Dr. Jeewan Singh Titiyal	Professor	Ophthalmology	✓	X	510	8386	49	205
2	Dr. Radhika Tandon	Professor	Ophthalmology	X		X	X	X	X
3	Dr. Sudarshan Kr. Khokar	Professor	Ophthalmology	X		X	X	X	X
4	Dr. Mandeep Singh Bajaj	Professor	Ophthalmology	X		X	X	X	X
5	Dr. Rajpal	Professor	Ophthalmology	X		X	X	X	X
6	Dr. Namrata Sharma	Professor	Ophthalmology	✓	✓	904	16205	64	347
7	Dr. Tanuj Dada	Professor	Ophthalmology	✓	X	477	9583	51	195
8	Dr. Neelam Pushkar	Professor	Ophthalmology	X		X	X	X	X
9	Dr. RohitSaxena	Professor	Ophthalmology	✓	✓	699	8824	49	176
10	Dr. Vinay Gupta	Professor	Ophthalmology	✓	✓	164	4586	36	95
11	Dr. Tushar Aggarwal	Professor	Ophthalmology	X	✓	X	X	X	X
12	Dr. M. Vanathi	Professor	Ophthalmology	✓	X	237	3312	31	68
13	Dr. Rajesh Sinha	Professor	Ophthalmology	✓	X	248	2851	32	74
14	Dr. Bhavna Chawla	Professor	Ophthalmology	✓		X	X	X	X
15	Dr. Parijat Chandra	Professor	Ophthalmology	✓	✓	183	2343	24	62
16	Dr. Noopur Gupta	Additional Professor	Ophthalmology	✓	✓	189	2896	29	60
17	Dr. Rohan Chawla	Additional Professor	Ophthalmology	✓	✓	358	2449	23	89
18	Dr. Vinod Kumar	Additional Professor	Ophthalmology	X		X	X	X	X
19	Dr. Swati Phujhale Alok	Additional Professor	Ophthalmology	X		X	X	X	X
20	Dr. RachnaMeel	Additional Professor	Ophthalmology	X		X	X	X	X

(Appendix-I Contd....)

...Contd. (Appendix-I)

21	Dr. ShoryaVardhan Azad	Associate Professor	Ophthalmology	X		X		X	X	X	X	X
22	Dr. DewangAngmo	Associate Professor	Ophthalmology	✓	X	120	955	17	24			
23	Dr. Neiwetelomi	Associate Professor	Ophthalmology	✓	X	78	343	9	9			
24	Dr. Prafulla Kumar Maharana	Associate Professor	Ophthalmology	X		X	X	X	X			
25	Dr. Shikha Gupta	Associate Professor	Ophthalmology	X		X	X	X	X			
26	Dr. RebikaDhiman	Associate Professor	Ophthalmology	X	X	X	X	X	X			
27	Dr. Amar Pujari	Associate Professor	Ophthalmology	✓	✓	170	860	14	30			
28	Dr. ManpreetKaur	Associate Professor	Ophthalmology	✓	X	58	1272	17	24			
29	Dr. Anu Malik	Assistant Professor	Ophthalmology	✓	X	9	53	4	1			
30	Dr. Sridevi Nair	Assistant Professor	Ophthalmology	✓	X	62	407	12	12			
31	Dr. Sahil Agrawal	Assistant Professor	Ophthalmology	✓	✓	91	128	5	0			
32	Dr. DeveshKuinawat	Assistant Professor	Ophthalmology	X		X	X	X	X			
33	Dr. Saurabh Verma	Assistant Professor	Ophthalmology	X		X	X	X	X			
34	Dr. Karthikeyan M.	Assistant Professor	Ophthalmology	X		X	X	X	X			
35	Dr. Jasbir Kaur	Professor	Ocular Biochemistry	✓	X	107	2887	31	51			
36	Dr. Alok Kumar Ravi	Professor	Ocular Biochemistry	X		X	X	X	X			
37	Dr. Nishat Hussain Ahmed	Additional Professor	Ocular Microbiology	✓	X	11	380	9	9			
38	Dr. KarmikaSaigal	Assistant Professor	Ocular Microbiology	✓	X	38	296	9	8			
39	Dr. Dilip R. Shende	Professor	Anaesthesiology	X		X	X	X	X			
40	Dr. Renu Sinha	Professor	Anaesthesiology	✓	✓	144	884	17	29			
41	Dr. Arshad Ayub	Associate Professor	Anaesthesiology	X		X	X	X	X			
42	Dr. KanilRanjith Kumar	Associate Professor	Anaesthesiology	X		X	X	X	X			
43	Dr. T. Velpandian	Professor	Ocular Pharmacology	✓	✓	339	5438	39	122			
44	Dr. NabanitaHalder	Professor	Ocular Pharmacology	✓	X	10	243	8	8			

(Appendix-I Contd....)

...Contd. (Appendix-I)

45	Dr. Praveen Vashisht	Professor	Community Ophthalmology	✓	X	159	4188	36	71
46	Dr. Senjam Suraj Singh	Professor	Community Ophthalmology	✓	✓	134	1565	22	40
47	Dr. Vivek Gupta	Additional Professor	Community Ophthalmology	✓	✓	119	3371	27	66
48	Dr. Seema Sen	Professor	Ocular Pathology	✓	X	293	2870	29	90
49	Dr. Seema Kashyap	Professor	Ocular Pathology	X		X	X	X	X
50	Dr. Sanjay Sharma	Professor	Radio Diagnosis	X		X	X	X	X
51	Dr. Pradeep Venkatesh	Professor	Investigative Laboratory	X		X	X	X	X
52	Dr. D. K. Sharma	Medical Supdt.	Hospital Administration	X		X	X	X	X

The Editors

Professor (Dr.) Ramesh C. Gaur is a distinguished scholar, administrator, and expert in library and information sciences, digital preservation, and cultural heritage. A Ph.D. Fulbright Scholar from Virginia Tech, USA, he currently serves as Dean (Administration) and Director & Head of the Kala Nidhi Division at the Indira Gandhi National Centre for the Arts (IGNCA), Ministry of Culture, Government of India. He is also In-charge of key national projects, including the Aatmanirbhar Bharat Centre for Design (ABCD), the National Mission on Cultural Mapping (NMCM) Project, and the Reorganization of Artworks & Aesthetics Projects undertaken by IGNSA at various institutions.



With an illustrious career spanning multiple prestigious institutions, Dr. Gaur has held leadership roles as Director of the National School of Drama (NSD) and Officer on Special Duty (OSD) at the Indian Institute of Heritage (IIH), Ministry of Culture, University Librarian at Jawaharlal Nehru University (JNU), New Delhi, and etc.

Dr. Gaur is the first Indian to be nominated as a Member of the International Advisory Committee (IAC) of UNESCO's Memory of the World (MoW) Programme and Co-Chair & Member of the UNESCO Global Task Force on the International Decade of Indigenous Languages (IDIL). His national engagements include membership in the Governing Council of INFLIBNET (UGC), the AIU Cultural Committee, and the Board of Studies at Kurukshetra University. He is also associated with Sanchi University of Buddhist-Indic Studies, Makhanaal Chaturvedi University, Dr. B.R. Ambedkar University (Delhi), Nalanda University, Central Sanskrit University, and NCERT. He has served on the UGC National Committee for Electronic Theses and Dissertations, the National Advisory Board for E-Shodh Sindhu National Consortia, and various committees of the International Federation of Library Associations (IFLA).

Dr. Gaur has received several national and international awards. He is widely respected for his expertise in research ethics, plagiarism detection, digital preservation of cultural archives, language documentation, and documentary heritage. A leading figure in the field of library and information sciences, Dr. Gaur has travelled extensively to more than 25 countries, contributing to global initiatives on cultural heritage, digital knowledge management, and academic research ethics.



Mr. Kumar Sanjay has been serving as the Director of the Library and Documentation Centre at NITI Aayog since 2020. Prior to this role, he worked as the Chief Librarian and Documentation Officer at NITI Aayog. With over 25 years of experience in various institutions and government organisations, Shri Kumar has been an integral part of the library profession. He has been a member of several committees established by different government institutions to categorise their libraries. Over the years, he has organised numerous programs and activities within his libraries. Additionally, he served as the editor of the CGLA News Bulletin and has published many articles in national and international journals, as well as in conference proceedings. From 2012 to 2020, he was a member of the Governing Board of DELNET. He holds a lifetime membership in several respected associations, including the Indian Library Association (ILA), IASLIC, Delhi Library Association (DLA), Central Government Library Association (CGLA), and the GILA. Currently, he is a member of the Course Coordinator Committee established by CBSE for curriculum design in Library and Information Science for vocational courses in classes XI and XII. He is also the Vice President of the Delhi Library Association (DLA).

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Dr. Ajit Kumar is presently working as Director and Head of the Central Secretariat Library, Ministry of Culture, Government of India. Presently, he has additional charge of Director General, Delhi Public Library, Ministry of Culture, Government of India. He had served the profession for more than twenty-five years in various capacities and positions.

He has been a Principal Library and Information Officer, Documentation Officer and an expert IT practitioner with hands-on experience in designing databases. He worked with different reputed organizations like the Prime Ministers Museum and Library, New Delhi; National Institute of Labour Economics Research & Development (formerly Institute of Applied Manpower Research) Delhi; Indian Law Institute, New Delhi, India International Centre, New Delhi, etc.

As an author has published 4 books and more than 50 papers and has also supervised more than 10 students of IGNOU for their dissertations. He is invited for lectures on the latest trends and technologies by different organizations and associations. He is a life member of ILA, DLA, CGLA, and other library professional bodies. He was the Secretary of the Central Government Library Association (CGLA) Delhi Branch. Dr. Ajit Kumar has received SRFLIS- World Library Leaders Promising Professional Award- 2017 for his services and expertise in the field of Library and Information Science. He also received Best Library Professional Award (Government) in 2019 and DLA Shanta Vashist Outstanding Library Award-2024.



Mr. Mukesh Kumar is presently working as "Library and Information Officer" in the Election Commission of India since 2021. Shri Kumar has over 27 years of experience in various National, Multinational and Government Organisations. He has given his service to Government of India, Ministry of Education, Book Promotion and ISBN Section, more than 04 Years and Ministry of Culture, Central Secretariat Library more than 15 years in the field of Automation of Library, Digitization of Gazette of India, Committee Commission Reports etc. He has also given his services to American Institute of Indian Studies, Gurugram for automation of the Library. He is a member of committees constituted by NITI Aayog, Government of India for PMO Project on "Integrating Libraries Housed in Various Union Government Ministries". He had organised several programmes /activities in the field of Libraries. He has expertise in Koha (an Open Source Library Management Software) and DSpace (an Open source Digital Content Management Software). He has published many articles in various national and international

conference proceedings. He is editor of CGLA News Bulletin and President of CGLA, Delhi. He has actively participated in library professional activities being a life Member of ILA, CGLA and other library professional bodies. Mr. Kumar has also received "Best Library Professional Award – Technical" in the year 2019 and 2024.