

DIGITAL LIBRARY EDUCATION AND TRAINING
(A Study of Opportunities and Challenges in India)



A Thesis Submitted to the
Vardhman Mahaveer Open University, Kota
FOR
THE AWARD OF THE DEGREE OF
DOCTOR OF PHILOSOPHY
IN
LIBRARY AND INFORMATION SCIENCE

Supervisor

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2021

DECLARATION

I hereby, declare that the thesis entitled, “**DIGITAL LIBRARY EDUCATION AND TRAINING (A study of Opportunities and Challenges in India)**” is submitted for the award of the degree of Doctor of Philosophy (Ph. D) in Library and Information Science, Vardhman Mahaveer Open University, Kota is a faithful record of the bonafide research work carried out by me. The work is original and has not been submitted previously to any other university for any other degree. I have carried out the present research under the able guidance and supervision of **Prof. (Dr.) Dinesh K. Gupta**, Professor, Department of Library and Information Science, Central University of Haryana, Mahendragarh (Ex-Professor in Library and Information Science, Vardhman Mahaveer Open University, Kota). The sources of material used and all assistance received during the course of research have been duly acknowledged.

The thesis has been submitted in accordance with the “University Grants Commission (Minimum Standards and Procedure for award of Ph.D. Degree), Regulation 2009.

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CERTIFICATE

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LIST OF ABBREVIATIONS

A&I	Abstracting & Indexing
AASL	American Association of School Libraries
ACM	Association for Computing Machinery
ACRL	Association of College and Research Libraries
ADRL	Alexandria Digital Research Library
ALA	American Library Association
ALIA	Australian Library and Information Association
A-LIEP	Asia-Pacific Conference on Library & Information Education & Practice
ARPA	Advanced Research Projects Agency
ASI	Archaeological Survey of India
BHU	Banaras Hindu University
BLIS	Bachelor of Library & Information Science
BSU	Bridgewater State University
CAORC	Council of American Overseas Research Centres
CAS	Certificate of Advanced Studies
CD	Compact Disc
CDC	Curriculum Development Committee
CDL	California Digital Library
CDL	Certificate in Digital Library
CDRI	Central Drug Research Institute
CE	Continuing Education
CEC	Consortium For Educational Communication
CEP	Continuing Education Programme
CH	Cultural Heritage
CHDLH	Cultural Heritage Digital Library in Hindi
CMS	Course Management Systems
COVID	Corona Virus Disease
CPD	Continuing Professional Development
CPDL	Certificate Programme on Digital libraries
CPE	Continuing Professional Education

CSIR	Council of Scientific and Industrial Research
CSS	Cascading Style Sheets
DESIDOC	Defence Scientific Information & Documentation Centre
DHTML	Dynamic Hypertext Markup Language
DIKSHA	Digital Infrastructure for Knowledge Sharing
DIS	Digital Information System
DL	Digital Libraries
DLE	Digital Library Education
DLF	Digital Library Federation
DLI	Digital Library Initiatives
DLIR	Digital Library for International Research
DOAJ	Directory of Open Access Journals
DOI	Digital Object Identifier
DRTC	Documentation Research and Training Centre
DSIR	Department of Scientific and Industrial Research
DVD	Digital Versatile Disc
E&T	Education & Training
EC	European Commission
ETD	Electronic Thesis and Dissertations
FAO	Food and Agriculture Organization
GIF	Graphics Interchange Format
GSDL	Greenstone Digital Library
HRD	Human Resource Development
HTML	Hypertext Markup Language
IARI	Indian Agricultural Research Institute
IAS	Indian Academy of Sciences
IATLIS	Indian Association of the Teachers of Library and Information Science
IAU	Islamic Azad University

ICAR	Indian Council of Agricultural Research
ICDL	International Conference on Digital Libraries
IEEE	Institute of Electrical and Electronics Engineers
IFLA	International Federation of Library Associations and Institutions
IGNCA	Indira Gandhi National Centre for the Arts
IGNOU	Indira Gandhi National Open University
IIM	Indian Institute of Management
IIT	Indian Institute of Technology
ILA	Indian Library Association
IMARK	Information Management Resources Kit
IMLS	Institute of Museum and Library Services
INASP	International Network for Advancing Science and Policy
INDEST	Indian National Digital Library in Engineering Sciences and Technology
INFLIBNET	Information and Library Network
INSDOC	Indian National Scientific Documentation Center
IR / IRs	Institutional Repository / Institutional Repositories
ISH	Information Super Highway
IT	Information Technology
IUCs	Inter University Centres
IUPUI	Indiana University-Purdue University at Indianapolis
JCDL	Joint Conference on Digital Libraries
JIIT	JP Institute of Information Technology
JISC	Joint Information Systems Committee
JPEG	Joint Photographic Experts Group
LCSH	Library of Congress Subject Headings
LIS	Library and Information Science
LISA	Library and Information Science Abstracts
LISTA	Library, Information Science and Technology Abstracts
LOC	Library of Congress
LRCN	Librarians Registration Council of Nigeria
MARC	Machine Readable Catalogue

MCIT	Ministry of Communication and Information Technology
MHRD	Ministry of Human Resource Development
MIT	Massachusetts Institute of Technology
MLIS	Master of Library and Information Science
MOOCs	Massive Open Online Courses
MPEG	Moving Picture Experts Group
NAAC	National Assessment and Accreditation Council
NASA	National Aeronautics and Space Administration
NCERT	National Council of Educational Research and Training
NDBIAC	National Databank on Indian Art and Culture
NDLI	National Digital Library of India
NDLTD	National Digital Library of Thesis and Dissertations
NEDCC	Northeast Document Conservation Center
NEHU	North Eastern Hill University
NELINET	New England Library Information Network
NEP	National Education Policy
NIC	National Information Centre
NIHFW	National Institute of Health and family welfare
NISCAIR	National Institute of Science Communication and. Information Resources
NIScPR	National Institute of Science Communication and Policy Research
NISSAT	National Information System for Science & Technology
NKC	National Knowledge Commission
NLA	Nigerian Library Association
NLM	National Library of Medicine
NPE	National Policy on Education
NSF	National Science Foundation

NUC	Commission of National Universities
NZDL	New Zealand Digital Library Project
OA	Open Access
OAI-PMH	Open Archive Initiative – Protocol for Metadata Harvesting
OCLC	Online Computer Library Center
OCR	Optical Character Recognition
ODL	Open and Distance Learning
OER	Open Educational Resources
OJS	Open Journal System
OJT	On the Job Training
PDF	Portable Document Format
PG	Post Graduate
PGDDIM	Post Graduate Diploma in Digital Information Management
PGDDLDM	Post Graduate Diploma in Digital Library and Data Management
PGDLIM	Post Graduate Diploma in Digital Library and Information Management
PLA	Public Library Association
RFID	Radio Frequency Identification
ROAR	Registry of Open Access Repositories
RUSA	Reference and User Services Association
SGML	Standard Generalized Markup Language
SJSU	San Jose State University
SLA	Special Libraries Association
SSLIS	Swedish School of Library and Information Science

SWAYAM	Study Webs of Active-Learning for Young Aspiring Minds
TCDL	Texas Conference on Digital Libraries
TISS	Tata Institute of Social Science
TLM	Teaching and Learning Material
TQM	Total Quality Management
U.S./U.S.A.	United States / United States of America
U. K.	United Kingdom
UG	Under Graduate
UGC	University Grants Commission
UNESCO	United Nations Educational, Scientific and Cultural Organization
URL	Uniform Resource Locator
VMOU	Vardhman Mahaveer Open University
WASC	Western Association of Schools and Colleges
WDL	World Digital Library
WWW	World Wide Web
YALSA	Young Adult Library Services Association

CHAPTER – 1

INTRODUCTION

1.0 Introduction

As we know, today's era is of information communication technology (ICT). Due to the increasing influence of information communication technology, revolutionary changes have emerged in every field. The form of information is taking an extreme form today. Organizing and managing information has been a challenging task from the beginning. As a result, the library and information science subject has emerged and developed. With this, Library and information science subject has included in education for the orderly and ideal operation of libraries and for the creation of skilled and competent library personnel. The first training for library science in India started at the Central Library, Baroda in 1911 by W. A. Borden (Singh, 2018). But with time, there is a change in every field and also there is a change in the needs and demands. These changes have also been observed in the field of Library and information science. Today, the nature of libraries has completely changed while compared to the earlier, depending on the nature of the sources of information and access to them. With this change, unprecedented changes are also being seen in the education provided to students in this subject.

According to Dr. S.R. Ranganathan's fifth law of library science “A Library is a growing organism” as the same the traditional libraries are being automated; e-resources are being remotely accessed; discovery services are being offered; more user centred services are being demanded. Now with such changes, new competencies and skills are being demanded for managing libraries in the modern digital environment. It has become very difficult for Library and information science (LIS) professionals to survive with the previously defined competencies and skills in this digital age. Digital libraries remained an important concept during last decade and becoming popular over passing of time, as today libraries regularly provide information and services in digital

form. As such, the nature and responsibilities of library professionals have to be changed in response to the modern digital environment.

At present, the amount of information is available more in digital format than print. Because today digital information has become more practical due to easier storage, processing, access, sharing, publishing and its other merits. As a result of this, traditional libraries are also being transformed into digital libraries today, in which born digital and digitized information is stored and organized. For proper maintenance and management of these digital libraries, generally library professionals are not competent. For this, they need to be taught and trained about the techniques and nuances of digital libraries, as well as it is very important to study the content related to digital library in the curriculum in Library and information science subject prominently.

Even, the emphasis on digital content, resources, platforms, libraries have been given in the National Education Policy (NEP) 2020, where the government will focus on the developments of digital libraries to encourage the reading habit, maximize library use, and assure the availability and accessibility of books to the public regardless of language, technology, or geography barriers. the NEP-2020 emphasizes the value of technology in assisting instructors, bridging the language gap between instructors and students, developing digital libraries, popularizing language learning, and assuring broader educational access.

It is clearly mentioned in report of NEP-2020 that “Public and school libraries will be significantly expanded to build a culture of reading across the country. Digital libraries will also be established. School libraries will be set up - particularly in villages - to serve the community during non-school hours, and book clubs may meet in public/school libraries to further facilitate and promote widespread reading. A National Book Promotion Policy will be formulated, and extensive initiatives will be undertaken to ensure the availability, accessibility, quality, and readership of books across geographies, languages, levels, and genres.” (NEP-2020, p. 9)

“A national repository of high-quality resources on foundational literacy and numeracy will be made available on the Digital Infrastructure for Knowledge Sharing (DIKSHA). Technological interventions to serve as aids to teachers and to help bridge any language barriers that may exist between teachers and students, will be piloted and implemented.” (NEP-2020, p. 9)

“Second, suitable infrastructure will be ensured so that all interested adults will have access to adult education and lifelong learning. A key initiative in this direction will be to use schools/ school complexes after school hours and on weekends and public library spaces for adult education courses which will be ICT-equipped when possible and for other community engagement and enrichment activities.” (NEP-2020, p. 52)

“The Central and State governments will take steps to ensure that books are made accessible and affordable to all across the country including socio-economically disadvantaged areas as well as those living in rural and remote areas. Both public and private sector agencies/institutions will devise strategies to improve the quality and attractiveness of books published in all Indian languages. Steps will be taken to enhance online accessibility of library books and further broad basing of digital libraries.” (NEP-2020, p. 52)

The National Education Policy 2020 (NEP-2020) is the first education policy of the 21st century, replacing the National Policy on Education (NPE) of 1986, which had been in existence for 34 years. The core pillars of the NEP 2020 are Access, Affordability, Equity, Quality, and Accountability. As said by Dr. S. Radhakrishnan, ex-president of India, "Library is the heart of an institution," making the existence of a library unavoidable in all institutions. When it comes to academic institutions, libraries play a critical role as an integral instrument of learning, from toddler-school life through higher education-colleges and beyond.

After the implementation of NEP-2020, the government will strengthen and increase the procurement of reading materials like books, journals, and other learning and teaching materials. But numerous library constraints emerge at the same time. So, it is reasonable to suppose that steps will be conducted to improve digital libraries and make library books more accessible online. E-content will also be available in regional languages. NEP-2020 recommended that the collection of libraries must be inclusive and include digital and multi-lingual. Overall, such impact of NEP-2020 would be apparent on the Indian library system that digital libraries are to be set up for extensive learning for students and the public.

This NEP-2020 also suggests the establishment of a public digital infrastructure that is open, interoperable, and evolvable in the education sector; Online teaching platform

and tools; Content creation, digital repository, and dissemination; 24X7 digital accessibility of content; e-learning platforms; online assessment and examinations; blended models of learning, and promoting research on online/digital education, those are important activities in light of the advent of digital technologies and the growing necessity of utilizing technology for teaching and learning at all levels, from elementary to higher education.

With the change in scenario of digital and information technology, the change is visible in all operations and processes of libraries. Changes have been clearly visible in the field of LIS education and training. Due to the impact of information technology on the faculty of library and information science, the amount of information in digital format is increasing rapidly, for this, the issue of preparing LIS students for the digital library environment will be important for LIS schools in India. Digital librarians are needed to choose, acquire, organise, make accessible, and maintain digital resources, as well as develop, execute, and support digital services in digital libraries (DLs). (Abrizah et al.,2009). So, people in-service also needs to be oriented towards working in such areas.

A library is characterized by its readers who are considered as supreme guest. LIS professionals need to equip themselves with digital competencies and resurrect the readers services lost to the digital world. Digital competencies are recognized as a necessity today for all library professional, digital competencies have become more essential as they have the responsibilities of guiding the information users are more inclined towards the digital resources available over the World Wide Web through the internet. (Gopalkrishan & Kumar, 2013).

According to National knowledge commission (NKC) report (2007), “India has a long tradition of libraries & has contributed to the development of basic concepts in the discipline such as fundamentals principles of library services & knowledge organization tools, R & D activities in LIS today are extremely limited. This is utmost concern for the growth of LIS profession in India.” NKC has recommended the development of digital library education both in English and Indian languages.

In the present digital age, library and information services are being operated in an increasingly automated modern technological manner, making it imperative for

libraries and information centers to transform the way they deliver their services. To work effectively in a digital environment, librarians need to be retrained with advanced technical skills, knowledge and experience that will enable them to manage digital information resources and services. (Gbaje, 2012).

Earlier library environments have shifted from traditional libraries to hybrid libraries due to new innovations-applications of Information and Communication Technologies (ICT) and its advancements, followed by the automated library and presently it has shifted to the digital library. With such changes, the structure and nature of the library as well as the profession of library and information science have changed dynamically. Now in this present situation library and information science, professionals are playing all-around multidisciplinary roles to satisfy the different perspectives of the end-users. (Halder, 2009)

The libraries in the beginning of the 21st century was named as libraries without boundaries or libraries having no walls or digital libraries. The developments taken place during recent years have witnessed the realities. More so, the COVID-19 pandemic situations have more clearly depicts the role of digital technologies, digital information and digital libraries.

In 2020, COVID-19 forced the whole world to change its overall policies during the infectious pandemic's lockdown period. Library services have also been severely affected due to this pandemic. For many public libraries, their access to digital content was the only thing that remained operational and available to its readers/users. As a result, the digital library's servers saw increasing pressure on the growing network traffic, enabling them to face such a problem. Library posts on social media, especially Facebook, were seen more frequently during the epidemic than in previous years' posts in the year 2020. During the pandemics-induced lockdown, social media messaging was an efficient tool to promote the digital library. (Ciric & Ciric, 2021)

In the current COVID-19 pandemics, whenever and wherever traditional and in-person education is not available, we must be prepared with alternative forms of high-quality education. In this sense, the National Education Policy 2020 emphasizes the importance of maximizing the benefits of technology while recognizing its risks and hazards. Meanwhile, existing digital platforms and continuing ICT-based educational

efforts must be enhanced and expanded to address present and future difficulties in providing high-quality education to all students. (NEP, 2020)

Mehta & Wang (2020) described the library's situation throughout the COVID-19 crisis in their study, as well as the unforeseen obstacles that the epidemic has brought to its digital services. It also explains how, from March 23, 2020, the library has transformed certain current services into a digital format and investigated new initiatives/practices to support complete online teaching and learning at the Bridgewater State University (BSU), USA. University library have faced many challenges by library staff. Some of the obstacles have provided opportunities for library personnel to learn, become more tech-savvy, and be more creative and collaborative, while others have created genuine impediments that have hampered their ability to execute their duties. The problems of digital library services present themselves in a variety of ways. Reaching out to faculty and students in the online/virtual world and engaging them in library services is critical, but it is also a huge challenge. The COVID-19 crisis has thrown digital libraries into the limelight because of the numerous advantages they provide that were previously unnoticed or non-existent. Digital libraries are proving their worth by offering more diverse and freer e-content as well as high-quality online services. Digital library services will continue to expand in popularity in the future.

In the present-day digital librarians have to prepare themselves properly to work in the technological and digital environment and also develop in themselves the necessary skills like leadership; managing digital information; they must have strong proficiency in communication, technical management, team building and better decision making in context to management of digital information content, digital/online platforms etc. Therefore, there is a dire need for library and information professionals to acquire relevant skills and expertise to become competent enough to survive the digital information world itself and serve in the digital culture. The main objective of the library and information education and training is to provide training for building leadership qualities among library and information professionals; to develop knowledge on the latest technologies of information storage, transfer and retrieval; help acquire the necessary skills in handling, accessing and using electronic resources, equipment and media; and helping to know the latest developments in information

technology etc. The educationists in India felt that “the emerging demands for digital librarians and the digital libraries may warrant the restructuring of LIS curriculum in India. It is also stated that the wide spread use of IT in the libraries has a direct impact on the LIS education”. There is absolutely no doubt that the responsibilities of library and information educationists in India have become one of the most challenging, and they have to figure out strategies to meet the future challenges, so that the students of library and information science schools in India are exposed to digital technology to get full efficiency and confidence to work in the environment. The electronic environment in the twenty-first century. It is highly recommended that information managers in India should be given an up-to-date and effective training due to the cut-throat competitive environment worldwide. What specific skills and competencies does a digital library professional need to function effectively? It is very important to find out which can be determined only through research. (Mahapatra, 2006)

Shem (2015) stated in his study that the standard of education, study and training require immediate attention in India. Other problems are that lack of professional accreditation by the “National Association and Accreditation Council” (NAAC) and unexpected enlargement of institutes and shortage of expert faculty, thus not attracting research and development funds and no initiative for indigenous knowledge research in India.

1.1 Concept and Definitions of Digital Library

After the invention of the World Wide Web (WWW), digital libraries received world-wide attention due to their unique capabilities and features around the end of the 20th century. In fact, digital information communication first appeared on digital libraries in April 1995, April 1998 and May 2001 by publishing special volumes focusing on their development and potential applications and developing digital libraries. Key benefits of digital libraries include storing resources in an easy-to-track digital format; Allowing remote, rapid, and unbiased access to digital library collections, and providing search technology that gives users greater flexibility and power (Thong and Hong, 2004). Although, there are same features in both digital libraries and traditional libraries in terms of selecting, acquiring, cataloguing, classifying, and disseminating information and knowledge. The main difference between a digital library and a

traditional library is that digital libraries have machine-readable data. This means that the traditional idea of collecting must be changed to embrace electronically available content.

There are many assumptions have written for understand the concept of on digital library. Levy & Marshall (1995) examined and assumed three characters of digital libraries: “(1) digital library collections contain fixed, permanent documents (2) digital libraries are based on digital technologies and (3) digital libraries are to be used by individuals working alone.”

Bawden & Rowlands (1999) have identified twenty assumptions, explicit or implicit of digital library: (1) There is (or will be) such a thing as a digital library, but a 'digital library' may be understood in different ways, and named differently. Terms such as: Electronic library, Virtual library, Hybrid library, Gateway library, Library of the future, Library without walls. (2) Digital libraries will contain material in digital form (3) A digital library will have an identifiable collection (4) There will be a continued emphasis on text in digital libraries (5) The contents of digital libraries will result from a publication process (6) Digital libraries will be concerned with preservation of material (7) Digital libraries will be used in much the same ways as traditional libraries (8) A digital library will include an equivalent of the traditional catalogue (9) A digital library will provide a range of searching and browsing tools (10) Digital libraries will provide integrated services, ideally approaching 'seamless' integration (11) Digital libraries will offer customised interfaces for particular users (12) Digital libraries will act as gateways or portals (13) Digital libraries will support the analysis and processing of information (14) Digital libraries will promote information literacy (15) Most, if not all, libraries will progress steadily to a 'fully digital' state over time and Most, if not all, libraries will remain indefinitely in a 'hybrid' state, with digital and non-digital resources offered side-by-side (16) Implementation of the digital library concept implies organisational and cultural change (17) It is possible to do research on digital libraries (18) It is possible to evaluate the effectiveness of digital libraries (19) The digital library builds upon the traditional strengths of the library/information professions (20) The digital library is a catalyst for the development of the library/information professions in entirely new ways and the digital library is marks the end for the traditional library/information professional.

Borgman (1992) highlighted that “digital libraries should not be based on access to digital information, it is combination of (i) A services; (ii) An architecture; (iii) A set of information resource, databases of text, numbers, graphics, sound, music or animation, etc.; and (iv) A set of tools and capabilities to locate, retrieve and utilize the information resources available.”

The Association of Research Libraries of United States in 1995 identified five general elements to define of digital library in the beginning phase of the digital library: (i) The digital library is not a single entity; (ii) The digital library requires technology to link the resources of many; (iii) These linkages between many digital libraries and information services are transparent to end-users; (iv) Universal access to the digital libraries and information services is the goal; and (v) Digital Library collections are not limited to documents surrogates, they also include digital artifacts that cannot be represented or distributed in printed formats.

In 1995, Information Infrastructure Technology and Applications (IITA) organised the workshop entitled "Interoperability, Scaling, and the Digital Library Research Agenda" The workshop's report defined digital libraries as follows: (Griffin, 1998): "An organized collection of multimedia data with information management methods that represent the data as information and knowledge."

Michael Lesk (1997), defines digital libraries as “organized collections of digital information that combine the structuring and gathering of information, which libraries and archives have always done, with the digital representation that computers have made possible. Digital information can be accessed rapidly around the world, copies for preservation without error, stored compactly, and searched very quickly. A true digital library also provides the principles governing what is included and how the collection is organized.”

Digital Library Federation (DLF) offered the following definition in 1998: "Digital libraries are organizations that provide the resources, including the specialized staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily and economically available for use by a defined community or set of communities".

Oppenheim and Smithson (1999) define digital library as “an information service in which all the information resources are available in computer processible form and functions of acquisitions, storage, preservation, retrieval, access and display are carried out through the use of digital technologies.”

William Arms (2001) defines digital libraries as “managed collection of information, with associated services, where the information is stored in digital formats and accessible over a network”.

According to previous studies, we can easily understand that a digital library must have digital items of the collections, computer’s hardware and software components with widely networks accessibility. It contains all types of digital items in different supported file formats and a single-time multiple users can access any information, which is available in the digital library.

1.2 Major Digital Library Initiatives: International and India

Today’s era is of digital, information, content, and technologies. Now all types of information are available easily through online/digital in some media or the other. This is no longer old that, Invention of Internet has on 1983 and www by Tim burners’ lee has come in exist on 1989 (Press, 2015). To Invention of internet and www very reflective impact had on libraries. It made traditional libraries to digital libraries. There have been many initiatives at the national and international level in the development and creation of digital libraries.

1.2.1 Open Access Repositories: Worldwide

Although, both digital libraries and repositories are similar terms. While institutional repositories are mainly sourcing with restricted user services, but digital libraries are often meant to store and retrieve content for a variety of uses such as reading, research, and so on. The interaction between repositories and the Open Access (OA) movement is a new trend in scholarly communication throughout the world (Gul, 2009). Registry of Open Access Repositories (ROAR) is source of available open access repositories at international level. ROAR has the feature of browsing country-wise, year-wise, repository type wise, and repository software wise. There is a total number of 5299 open access repositories that have existed worldwide (ROAR, 2021). Table 1.1 shows

year-wise growth of open access repositories in the World and graphical representation of the same is given in Figure 1.1.

Table – 1.1: Year-wise Growth of Open Access Repositories in the World

Year	Number of Repository	Year	Number of Repository
2021	53	2005	206
2020	234	2004	143
2019	322	2003	86
2018	147	2002	52
2017	232	2001	27
2016	264	2000	17
2015	235	1999	13
2014	392	1998	9
2013	237	1997	6
2012	630	1996	3
2011	319	1995	9
2010	474	1994	1
2009	330	1993	4
2008	282	1991	2
2007	200	Not Specified	15
2006	355	Total	5299



Figure 1.1: Year-wise Growth of Open Access Repositories in the World

Table 1.2 depicts the resource-wise distribution of open access repository worldwide. Open access repositories having different types of resources, such as: Research Institutional or Departmental; e-Theses; Research Cross-Institutional; Research Multi-institution Repository; e-Journal/Publication; Learning and Teaching Objects; Database/A&I Index; Research Data; Open and Linked Data; Demonstration; Web Observatory, etc. The majority of 3733 open access repositories have research institutional or departmental type resources. Figure 1.2 shows the graphical representation of the same.

Table – 1.2: Resource-wise Open Access Repository: Worldwide

S. No.	Type of Resources	Number of OA Repository
1.	Research Institutional or Departmental	3733
2.	Others	407
3.	e-Theses	344
4.	Research Cross-Institutional	293
5.	Research Multi-institution Repository	140
6.	e-Journal/Publication	120
7.	Learning and Teaching Objects	76
8.	Database/A&I Index	72
9.	Research Data	51
10.	Open and Linked Data	41
11.	Demonstration	20
12.	Web Observatory	2
Total		5299

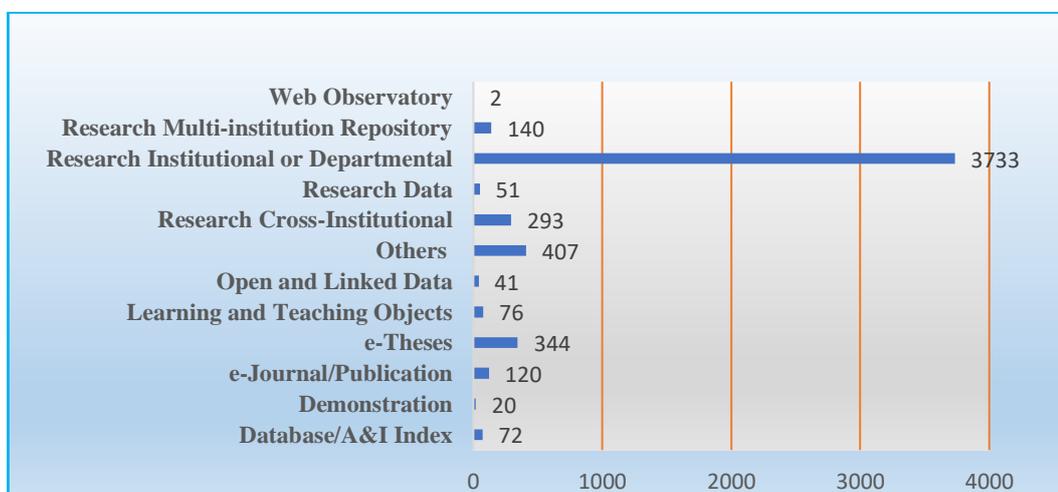


Figure 1.2: Resource-wise Open Access Repository: Worldwide
Source: <http://roar.eprints.org/> (*Registry of Open Access Repositories*)

Based on available data of ROAR website, there are a total number of 4574 open access repositories existed in the world according to geographical namespace. Most of the open access repositories are in Europe then North America then Asia continentals. Only 122 (i.e., 2.67%) open access repositories are existed in India under the Asia continental. This makes it seem that there is a lack of repositories or digital libraries in India. Table 1.3 number of existed open access repositories in the world and graphical representation of the same is given in Figure 1.3.

Table – 1.3: Number of Existed Open Access Repositories: Worldwide

S. No.	Region	Number of OA Repository
1.	Africa	177
2.	Asia (In India = 122, i.e., 2.67%)	1009
3.	Europe	1692
4.	North America	1021
5.	Oceania	99
6.	South America	576
Total		4574

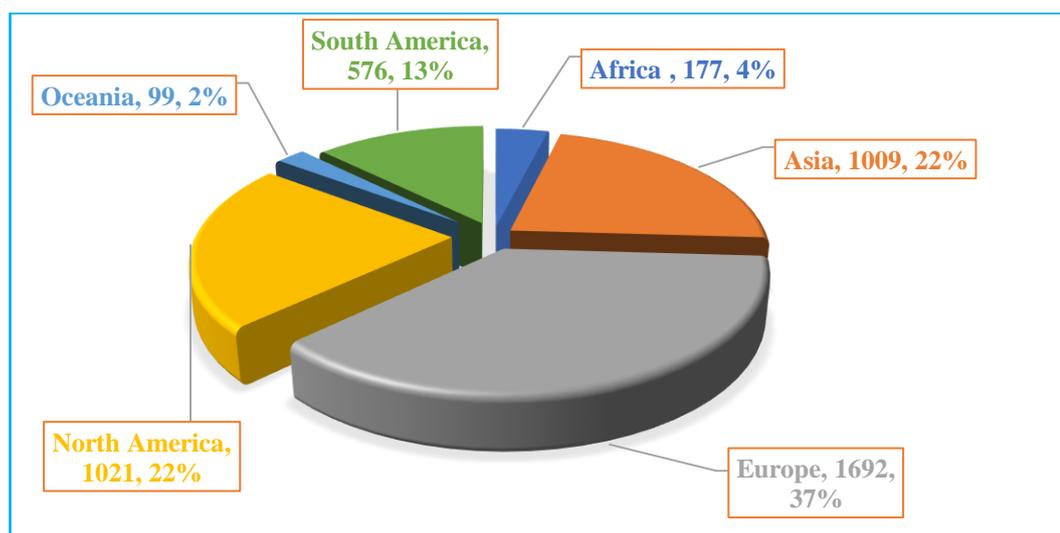


Figure 1.3: Graphical Representation of Number of Existed Open Access Repositories in the World

Open access repositories or digital libraries are built by a variety of open source and proprietary software. Table 1.4 shows software wise distribution of open access repositories in the world. Most of the open access repositories are built on DSpace, Eprints open-source digital library/repository softwares.

Table – 1.4: Software wise Distribution of Open Access Repositories in the World

S. No.	Software	No. of OA Repository	S. No.	Software	No. of OA Repository
1	DSpace	2259	17	MiTOS	11
2	Eprints	712	18	Fedora >Fez	10
3	Other Software (various)	630	19	DigiTool	7
4	BePress	499	20	Equella	7
5	OPUS	96	21	DoKS	5
6	Fedora	60	22	PMB Services	5
7	Open Journal System	42	23	ARNO	4
8	ETD-db	30	24	SBCAT	3
9	CDS Invenio	28	25	SciX	3
10	DiVA	26	26	EDOC	1
11	Greenstone	25	27	KeyStone DLS	1
12	DIGIBIB	24	28	SobekCM	1
13	HAL	24	29	WIKINDX	1
14	Open Repository	24	30	Zentity	1
15	ContentDM by OCLC	14	31	i-Tor	1
16	MyCoRe	12			

1.2.1 Major Digital Library Initiatives in the world

In the initially stage of development of digital libraries, during the year 1994, the United States (U.S.) under its National Digital Library initiative launched six important digital library projects that were jointly funded by the National Science Foundation (NSF), Department of Defense - Advanced Research Projects Agency (ARPA), and the National Aeronautics and Space Administration (NASA). It is also considered as first global digital library initiatives (DLI-I) (Berry, 1996). Major U.S. National digital libraries initiatives are given in Table – 1.5:

Table – 1.5: The U.S. National Digital Library Initiative (DLI-I)

S. No.	Name of Digital Library Project	Initiated by	Description
1.	"The Environmental Electronic Library: A Prototype of a Scalable, Intelligent, Distributed Electronic Library"	University of California, Berkeley	This project produced a prototype digital library with an emphasis on environmental data. The data gathered can be used to prepare and evaluate environmental data, impact reports, and other resources.
2.	Informedia: Integrated Speech, Image and Language Understanding for Creation and Exploration of Digital Video Libraries	Carnegie Mellon University	This is interactive online digital video library system which created by Carnegie Mellon University and WQED, Pittsburgh. It allows users to search, browse, and obtain scientific and mathematics information from video archives. The Informedia system works by combining technologies for audio, picture, and natural language interpretation.
3.	The University of Michigan Digital Libraries Research Proposal	University of Michigan	This digital library's content is based on earth and space sciences. The library system, which has the potential to link thousands of users and information repositories, was created to address the demand for systematizing a large amount of knowledge available on the Internet on a variety of themes.
4.	The Alexandria Project: Towards a Distributed Digital Library with Comprehensive Services for Images and Spatially Referenced Information	University of California, Santa Barbara	This digital library was created to make enormous and diversified collections of maps, photographs, and graphical materials, as well as a full variety of innovative electronic library services, easily accessible.
5.	The Stanford Integrated Digital Library Project	Stanford University	The goal of the Integrated Digital Library was to establish a shared environment that linked everything from personal information collections to collections available in traditional libraries today, as well as big data collections shared by scientists. Information sharing and communication models, client information interfaces, and information seeking services are among the project's research focuses.

6.	Building the Digital Infrastructure for a University Community	Interspace: Library for a Engineering	University of Illinois, Urbana Champaign	The engineering literature is represented in this digital library through periodicals and periodicals in structured SGML format with visual elements, which were obtained through partnership with professional (e.g. IEEE) and commercial (e.g. Wiley) publishers.
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Bansode & Pujar (2008) highlighted major scholarly digital library initiatives at the international and national levels. A list of major digital library initiatives in the world given in Table 1.6.

Table – 1.6: Major Digital Library Initiatives in the World

S. No.	Name Digital Library Initiative	Year	Software (s) (If any)	Initiated by	Description/ Content type
1.	World Digital Library (WDL) URL: https://www.wdl.org/	2009	Format- Web Archive	U.S. Library of Congress (Supported by UNESCO)	The content available at WDL includes cultural treasures and important historical documents including books, manuscripts, maps, newspapers, magazines, prints and photographs, sound recordings and films, etc.
2.	Networked Digital Library of Theses and Dissertations (NDLTD) URL: http://www.ndltd.org/	1996	ETD db Powered by Google Sites	A federated effort of over 120 universities at international level (Co-ordinated by Virginia Tech)	The National Digital Library of Thesis and Dissertations (NDLTD) is a worldwide organization committed to encouraging the acceptance, development, usage, distribution, and preservation of electronic versions of traditional paper-based theses and dissertations.
3.	Alexandria Digital Research Library (ADRL)	1990	Samvera	UC Santa Barbara Library	The repository initially launched hosting Electronic Theses and Dissertations (ETDs). Collections of

	URL: https://www.alexandria.ucsb.edu/			Santa Barbara, California	digital research materials, including images, text, streamed media, and numeric and spatial data.
4.	Arizona Memory Project URL: https://azmemory.azlibrary.gov/	2006	CONTENTdm	Arizona State Library, Archives and Public Records, a division of the Secretary of State	Government documents, photographs, maps, and multimedia that chronicle Arizona's past and present.
5.	California Digital Library URL: https://cdlib.org/	1997	Melvyl (Discovery platform powered by OCLC)	The University of California	CDL built one of the world's largest digital research libraries for faculty, students, and researchers. Its main mission was to provide a better system for scholarly information management and improved support for teaching and research.
6.	Digital Library of Georgia URL: https://dlg.usg.edu/	-	-	University System of Georgia	The Digital Library of Georgia provides access to digitized books, manuscripts, pictures, government documents, newspapers, maps, audio, video, and other material related to Georgia's history and culture.
7.	Digital South Asia Library URL: https://dsal.uchicago.edu/	-	Drupal Map Tiler Internet Archive Bookreader	University of Chicago	Scholars, government officials, business executives, and other users can utilise the Digital South Asia Library to access digital documents for reference and study on South Asia.
8.	Digital Library for International Research (DLIR) (Formerly American	1999	Joomla	The Council of American Overseas Research Centres (CAORC)	It provides cost-effective, efficient, centralized, internet-based mechanism for the standardization and electronic delivery of important bibliographic

	Overseas Digital Library) URL: http://dlir.org/				information to international users.
9.	National Science Digital Library URL: https://nsdl.oercommons.org/	2000	Oracle database software	National Science Foundation (NSF)	NSDL provides high-quality online study materials for teaching and learning at worldwide level, with a current focus on the sciences, technology, engineering, and mathematics (STEM) disciplines—both formal and informal, institutional and individual.
10.	The New Zealand Digital Library Project http://www.nzdl.org/cgi-bin/library.cgi	1995	Greenstone Digital Library Software	The University of Waikato, New Zealand	NZDL project's goal is to develop the technology that underpins digital libraries and make them freely available so that others may use it to build their own digital libraries.

1.2.3 Major Digital Libraries Initiatives in India

The Digital Library of India (DLI) is the greatest digital library initiative in India and other important of digital libraries in India are: The India Educational Digital Library, The Indian National Digital Library in Engineering Sciences and Technology (INDEST) consortium, Muktgandha Digital Library, Vidhyanidhi, Vigyan Prasar Digital Library, Archives of Indian Labour, Cultural Heritage Digital Library in Hindi (CHDLH) etc. Most of digital libraries in India cover heritage and cultural, social, educational and scientific materials from Vedic period to modern time. These libraries are greater assets to the present and future generation's needs. (Singh, 2012).

With the availability of advanced information and communication technologies (ICT) in India and due to the information infrastructure, there has been an increasing amount of growth in the development of digital libraries. Traditional knowledge, old publications, rare documents, thesis, and dissertations, and journals available in Indian libraries are being digitized and made easily accessible to the public. The National Digital Library of India (NDLI) is a major initiative to bring the information of all

subjects in a digital form at the national level, which is a significant effort to make a truly digital library. Shodhganga Digital Repository has been created for the availability of electronic thesis through an online centrally maintained digital repository. Also, in the last few years, many efforts have been made by various institutions research institutions, national level institutions, state level institutions and other private institutions and organisations also playing a key role in implementation and development of digital libraries in India (Naskar & Barui, 2016). Table 1.7 depicts the major digital library developments and initiatives started in India:

Table – 1.7 Major Digital Libraries Initiatives in India

S. No.	Name of Digital Library Initiative / Programme	Year	Organization/ Institute	Available Resources
1.	Digital Library of Books			
1.1	National Digital library of India URL: <i>https://ndl.iitkgp.ac.in/</i>	2006	Ministry of Education, The Government of India. (Maintaining by IIT, Kharagpur)	Textbooks, articles, videos, audio books, lectures, simulations, fiction and all other kinds of learning media.
1.2	Vigyan Prasar Digital Library URL: <i>https://vigyanprasar.gov.in/digital-repository/</i>	2005	Department of Science and Technology (DST), Government of India	Posters, Interactive CD's/DVD's on different subjects related to science, Biographies, News and Articles, On line quiz and so on
1.3	NCERT Online Text Book URL: <i>https://ncert.nic.in/textbook.php</i>	-	National Council of Educational Research and Training (NCERT)	Textbooks of all subjects published by NCERT for classes I to XII in Hindi, English and Urdu.
2.	Digital Library of Manuscripts			
2.1	Kalasampada: Digital Library Resources for Indian Cultural Heritage URL: <i>http://www.ignca.nic.in/dlrich.html</i>	-	The Indira Gandhi National Centre for the Arts (IGNCA) in collaboration with the Ministry of Communication and Information Technology	Digital images of cultural heritage resources such as manuscripts, rare photographs, rare books, rare painting, sculptures, handicrafts, monuments, artifacts, festivals, as well as varieties of textual, graphical, audio-visual

				and multimedia resources.
2.2	National Databank on Indian Art and Culture (NDBIAC) URL: http://ignca.nic.in/ndb_0001.htm	2006	The Indira Gandhi National Centre for the Arts (IGNCA): A pilot project of Department of Information Technology, Ministry of Communication and Information Technology (MCIT), and Archaeological Survey of INDIA, Government of India	Digitized images and audio visuals provided by ASI and state archaeology departments
2.3	National Mission for Manuscripts URL: https://www.namami.gov.in/	2003	Ministry of Tourism and Culture, Government of India	Indian manuscripts (which are available in variety of themes, textures and aesthetics, scripts, languages, calligraphies, illuminations and illustrations.)
2.4	Muktabodha: Digital Library and Archiving Project URL: https://muktabodha.org/	2003	Muktabodha Indological Research Institute	Sanskrit manuscripts and texts: Scriptural texts related to the Tantric and Agamic traditions, as well as India's oral tradition of Vedic chanting and the ritual and philosophical knowledge associated with it.
3.	National Digital Library of Electronic Thesis & Dissertation			
3.1	Shodh Ganga: Indian ETD Repository URL: https://shodhganga.inflibnet.ac.in/	2009	INFLIBNET Centre under support of University Grants Commission (UGC)	Indian theses and dissertations
3.2	Vidyanidhi Digital Library	2000	Department of Library	Doctoral research in India

	URL: http://www.unimysore.ac.in/english-version/library/index.php		Science, University of Mysore. Supported by NISSAT, DSIR, Government of India, Ford Foundation and Microsoft India.	
3.3	Krishi Kosh URL: https://krishikosh.egranth.ac.in/	-	ICAR-IARI, New Delhi	Thesis, research journals, articles and other reports.
4	Digital Library of Journals			
4.1	Indian Academy of Sciences URL: https://www.ias.ac.in/Journals/	-	Indian Academy of Sciences (IAS), Bangalore	13 peer reviewed journals with all backfiles and other publications including reports, newsletter, patrika, year book and annual report etc.
4.2	NISCAIR Online Periodicals Repository (NOPR) URL: http://nopr.niscair.res.in/	2008-9	CSIR-NISCAIR, New Delhi	19 Scientific journals and 3 Science magazines published by NISCAIR

1.3 History and Development of Digital Library Education

From the beginning till now, there have been many changes in LIS education & training in India. Education in 'library science' to 'library and documentation science' then 'Library and information science' and now 'digital libraries. According to Pomerantz, et al (2006) for digital library education received first attention since 1999 in Malaysia. Bakeri (2009) mentioned that the first 'Master programme in Digital Library' was started in the Department of Computer Science at the National Chiaotung University, Taiwan first in the world. American Library Association (ALA) also granted accreditation to many digital library education initiatives (Saracevic and Dalbello, 2001). The Study of Ma, et al (2006) has suggested following contents to be include in digital library education programmes: Digital Library Design, Digital Preservation Digitization, Digital Technology, Metadata and Digital Collection Management. Many developing countries in the world like Nigeria, Africa and South

America have less attention for Digital Library Education Beside this, several positive efforts in digital library education have been done in Malaysia, USA, Canada, United Kingdom (UK), Australia and New Zealand. (Shem, 2015).

1.4 Digital Library Education and Training in India

Education is very necessary source for human being for their growth and development. Education must be a valuable effort that makes life for today and for the future. Education provided in two ways either formal or informal type. Digital libraries are having contents are in digital form. These are technologically driven and contain use of the computers and other technologies.

As digital libraries are developing as a significant area of research and training in the creation of digitized collections. In India, more than hundred Universities offering the courses in Library and information science subject, either at certificate, UG and PG levels. The fact remains, and that is there very less component on digital library studies in LIS curricula in Indian Universities (Safi, et. al., 2011).

Insufficient or lack of qualitative and original research, education, training and lack of cooperation and collaborations, perpetual variations in the libraries, new systems and techniques of data management, difficulties in information retrieving using information communication technology and delivery of quality data are the main problem and as well as LIS education has some flaws in India. These issues are being emerged due to new technologies, internet, web-based tools, information storage, content type, etc. (Bakeri,2009).

The number of universities and institutions offering education and training has further risen during recent years. Even the focuses of areas in library education and training have also been changing in recent years. Varalakshmi (2009) described in her paper that digital library course components are fundamental in nature and must be further expended to gain the depth of knowledge and skills in a particular area of specialization. And concluded that it was needed to update curricula and course syllabi on digital libraries and this needs restructuring and re-engineering the DL courses in India.

The paper further describes that the UGC efforts in the development of LIS education are evidenced by the three Curriculum Development Committees (CDC) (1965, 1992, 2001) on LIS education. The LIS departments, to keep pace with the emerging trends, have revised their syllabi per recommendations of Model Curriculum Library and information science (UGC, 2001)

Digital library education has a global impact in India too. Some universities and institutions have started independent courses/ programmes in digital library in the past (as some of the courses/programmes discontinued), details are as follows (Table -1.8):

Table – 1.8: Core Programme/Course on Digital Libraries in Indian Universities/Institutes

S. No.	Name of digital library course/ programme	University/Institute
1.	<i>P.G. Diploma in Digital Library & Information Management (ODL Programme)</i>	Tata Institute of Social Sciences, Mumbai
2.	<i>Certificate Programme in Digital libraries (CPDL) – (Closed)</i>	Department of Library & Information Science, Vardhman Mahaveer Open University, Kota
3.	<i>Post Graduate Diploma in Digital Library and Data Management (PGDDLDM)</i>	Indira Gandhi National Centre for the Arts (IGNCA), New Delhi
4.	<i>Certificate in Digital Library (CDL)</i>	Odisha State Open University, Sambalpur
5.	<i>Post Graduate Diploma in Digital Library and Information Management (PGDLIM)</i>	Schools of Library & Information Science, Central University of Gujarat, Gandhinagar
6.	<i>Post Graduate Diploma in Digital Library Management (PGDLIM)</i>	Department of Library & Information Science, University of Pune
7.	<i>Post Graduate Diploma in Digital Information Management (PGDDIM)</i>	Osmania University, Hyderabad

Certificate level 15 weeks Massive Open Online Course (MOOC) on “**Digital Library**” has been conducted through SWAYAM, MHRD, Govt. of India.

Information communication between professionals in the same subject area is very important. In earlier times the opportunities and tools of communication between professionals in any field were very few. There were serials publications, training courses and seminars to gather and express their opinions and share communications to update library and information science professionals. (Anish & Kumar, 2013). A random study of a listserve (LIS-Forum) was made to know the communications over the digital library related professional activities taken place. The following Table 1.9 gives an idea of the professional development activities undertaken in the country:

Table – 1.9: Year wise Statistics of Digital Library Training and Their Objectives (LIS Forum Search)

Year	No. of Workshop/Seminar/Conference based on Digital Libraries in India	Analysed different objectives of all workshops/seminar/conference other training programmes
2003	3	<ul style="list-style-type: none"> ➤ <i>Building Digital Libraries</i> ➤ <i>GSDL</i> ➤ <i>DSpace</i> ➤ <i>Digital libraries and Web technologies: challenges and opportunities</i> ➤ <i>Design and Development of Digital Libraries</i> ➤ <i>Digital Library Initiatives</i> ➤ <i>Digitization of Resources</i> ➤ <i>Open Access Repositories</i> ➤ <i>Digitization and Networking</i> ➤ <i>Digital Preservation</i> ➤ <i>Advanced GSDL and RFID</i> ➤ <i>Digital Libraries and e-Learning</i> ➤ <i>TQM in Digital Libraries</i> ➤ <i>Interfaces of Digital Library</i> ➤ <i>Building of Institutional Archives</i>
2004	4	
2005	3	
2006	8	
2007	8	
2008	12	
2009	4	
2010	6	
2011	7	
2012	3	
2013	4	
2014	5	
2015	6	
2016	17	
2017	8	
2018	10	
2019	7	
2020	9	
Total:	124	

		<ul style="list-style-type: none"> ➤ <i>Creation and Management of Digital Collection</i> ➤ <i>Digital Objects and Metadata: Preservation, Harvesting and Migration</i> ➤ <i>Etc.</i>
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(Accessed by: <http://ncsi.iisc.ernet.in/pipermail/lis-forum/> ; data up to December 2020)

The Table 1.9 shows about the programmes organized (workshops/seminar/short term course/Conference/ Webinars, etc.) related to Digital Library during the year of 2003 to 2020 in India. 124 programmes have been organized during the period. During COVID-19 pandemic six online webinars have conducted on digital library related themes If, shortlisted according to topic/theme include: Building Digital Libraries, GSDL, DSpace, digital libraries and Web technologies : challenges and opportunities, Design and, Development of Digital Libraries, Digital Library Initiatives, Digitization of Resources, Open Access Repositories, Digitization and Networking , Digital Preservation, Advanced GSDL and RFID, Digital Libraries and e-Learning, TQM in Digital Libraries, Interfaces of Digital Library, Building of Institutional Archives , Creation and Management of Digital Collection, Digital Objects and Metadata: Preservation, Harvesting and Migration. This data has been gathered from *the LIS - forum mailing list (Archives)*.

1.5 Growth of Literature on the Subject

About rationality of this study, a search was carried out in Library, Information Science and Technology (LISTA) database using the keyword “Digital Library or Digital Libraries” as title search with bullion operator using ‘And’ for “Education and Training” and using ‘or’ for Competency as full text to see the growth of scholarly content on the topic. Table 1.10 shows growth of literature on the topic within two year (from January 2000 to December 2019):

Table – 1.10: Number of Researches on Digital Library Education and Training (LISTA Database Search Results)

S. No.	Duration Range	Number of Search Results
1	Jan. 2000 – Dec. 2001	104
2	Jan. 2002 – Dec. 2003	161

3	Jan. 2004 – Dec. 2005	269
4	Jan. 2006 – Dec. 2007	299
5	Jan. 2008– Dec. 2009	385
6	Jan. 2010 – Dec. 2011	383
7	Jan. 2012 – Dec. 2013	386
8	Jan. 2014 – Dec. 2015	379
9	Jan. 2016 – Dec. 2017	400
10	Jan. 2018 – Dec. 2019	409

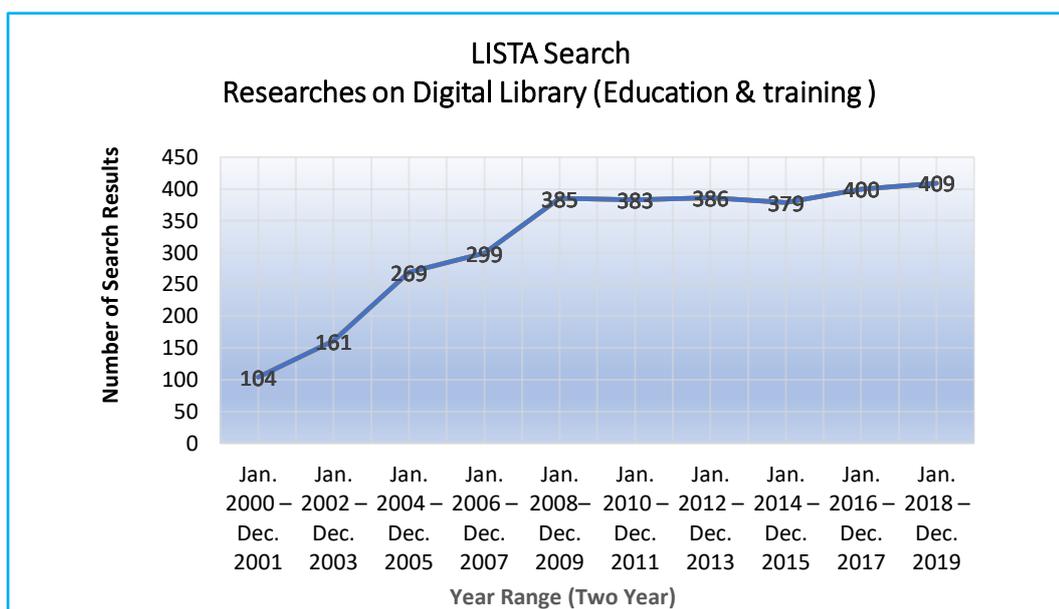


Figure 1.4: LISTA Search: Researches on Digital Library (Education & Training)
(Source: www.libraryresearch.com; accessed on 05.08.2020)

From the Figure 1.4 shows that during the year of January 2000 to December 2001, during the 20 years period, only about 104 papers were authored on this area of the study and covered in the LISTA database in the January 2000 to December 2019. There after the growth has been rapidly increase of scholarly content began to appear which continue to grow.

Table – 1.11: Number of Researches on Digital Library Education and Training (LISA Database Search Results)

S. No.	Duration Range	Number of Search Results
1	Jan. 2000 – Dec. 2001	17
2	Jan. 2002 – Dec. 2003	221
3	Jan. 2004 – Dec. 2005	279
4	Jan. 2006 – Dec. 2007	326

5	Jan. 2008– Dec. 2009	355
6	Jan. 2010 – Dec. 2011	415
7	Jan. 2012 – Dec. 2013	548
8	Jan. 2014 – Dec. 2015	643
9	Jan. 2016 – Dec. 2017	734
10	Jan. 2018 – Dec. 2019	789

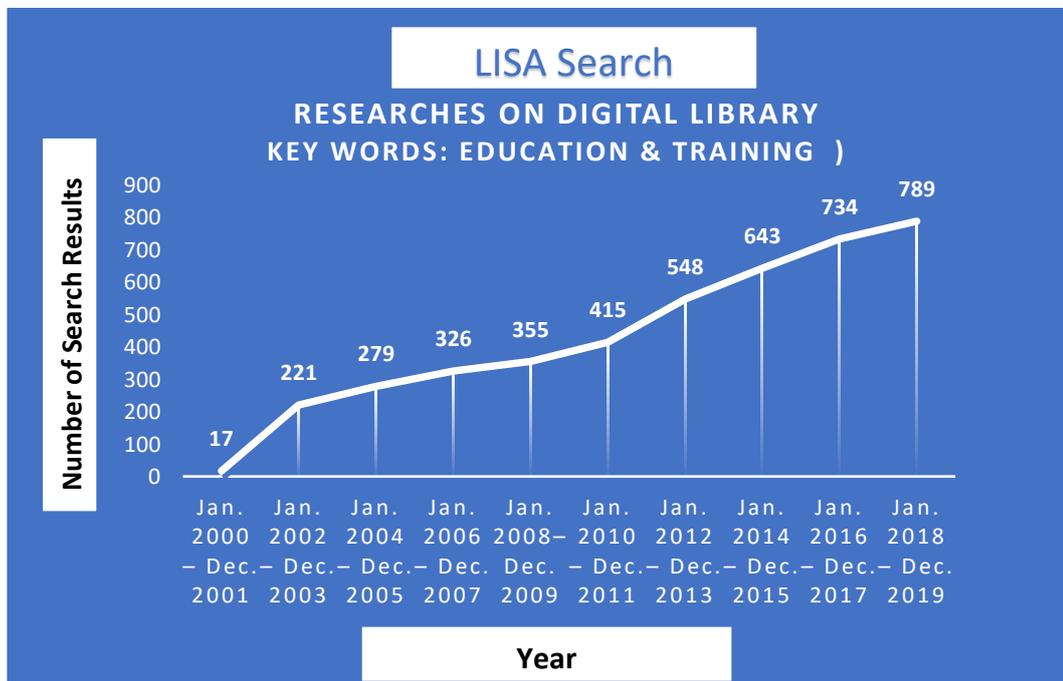


Figure 1.5: LISA Search: Researches on Digital Library Education and Training
(Source: <http://www.proquest.com/products-services/lisa-set-c.html>; accessed on 07.08.2020)

Same search was carried out in “Library and information science Abstracts” (LISA) database. From the Table 1.11 shows that during the year of 2000 to 2019, during the 20 years period, only about 17 papers were authored on this area of the study and covered in LISA database in the January 2000 to December 2001. There after the growth has been rapidly increase of scholarly content began to appear which continue to grow. Figure 1.5 gives graphical representation of the same. From results of both databases (LISTA and LISA), shows that area of digital library education & training is a more sustainable for research in present situation of Library and information science discipline.

1.6 Need for the Study

Digital library has an important role in teaching and training. Which has emerged as an effective medium in higher education in the changing scenario. Digital libraries facilitate publishers to provide university scholarly resources to researchers in an internationally inclusive and cooperative manner. They allow faculty and students to easily access a rapidly growing collection of valuable content.

Prime minister of our country **Mr. Narendra Modi** envisioned to **Make a Digital India** in his speech on occasion of 68th Independence Day (15th August'2014) of India.

Similarly, the then Human Resource Development (HRD) Minister **Mrs. Smriti Irani** also declared to launch a “**National Electronic Library**” in her speech on the occasion of Teacher’s Day (5th, September'2014). Electronic library is as like a synonym of digital library, so that this would be much needed to acquire the emerging challenges, opportunities, problems etc. towards these types of libraries. The National Digital Library of India (NDLI) is a flagship project under the Ministry of Education, Government of India, which aims to collect and collate metadata from several international and national level digital libraries as well as other relevant sources and provide full text indexed digital content in of all subjects. It is a digital repository that contains articles, textbooks, audio-videos, books, lectures, fiction, and informative study material related to all types of teaching media. NDLI is a multilingual digital content online platform, which was inaugurated by the former Union HRD Minister Shri Prakash Javadekar on June 19, 2018.

In BJP election manifesto 2013 **Chief Minister** of Rajasthan state **Smt. Vasundhara Raje** declared that Library science curriculum will be expanded and “**Mukhyamantri Rajasthan School Digital Library Yojana**” will be implemented for establishing of **Digital Libraries** in secondary and Senior Secondary schools of Rajasthan state

Government of India is implementing ‘**Digital India Initiative**’ through Ministry of Human Resource Development (HRD). UGC has been aware to the Universities that the ‘Digital India Initiative’ is being monitored by the Government at highest level. (**Sandhu, 2015**).

When the need for recent research and developments is found, the recent NEP-2020 also substantial the need for digital content and DL in the education system. Digital libraries are very important part to make a whole digital India, so such as study very needed for this direction. There has not been any research conducted in the area of competency development on digital libraries in India and challenges and available opportunities regarding educational training to digital library professionals.

What and how can develop competencies and what are challenges and opportunities available regarding education & training of digital LIS professionals. This remains an important problem in the discipline of Library and information science.

1.7 Significance of the study

The importance of education and training need in digital libraries is quite clear from the literature reviewed. There is no systematic study, which analyses education for new entrants and training of in-service library professionals on the digital libraries area in the country. There is no blue print of available opportunities of education and training on digital libraries in the country and problems encountered. As such present study is an attempt in this direction.

The outcome of the research can prove to be a milestone in empowering the library and information science professionals, so they are able to manage library situation in the digital environment. It is hoped that this study would be an attempted to fill the gaps by looking at the status of digital library education & training in India.

1.8 Research Objectives

- To ascertain overall impact of Digital Library developments on Library and Information Environment.
- To study and review concepts, acceptances & applications of Digital Libraries.
- To analyse opportunities for education and training in the area of Digital Libraries.
- To enquire into the barriers of accepting Digital Libraries as area of study of education and training.

- To suggest appropriate measures for effective education and training for better development of Digital Libraries.

1.9 Research Methodology

The following steps have followed to achieve the desired output as stated in the expected outcomes of the study:

Step-1: Literature Search and Review

Researcher consulted background material such as relevant books, journals, conference proceedings, online web sources and other reference material. Appropriate primary and secondary sources were identified by the researcher and used. Research papers searched from peer-reviewed and indexed journals through LISTA and LISA database and Google Scholar using relevant keywords. Relevant and highly cited research papers identified from references of the pre-searched related research papers and explored with full text. Further these relevant papers have reviewed under headings and subheadings with their references for more clear understanding of author's ideas and analysis.

Step-2: Discussion with Experts

The researcher has made information and communication area personal discussion with prominent authors, practitioners, researchers, and teachers in the field of Digital libraries. This discussion has enabled to put a continuous debate on the subject and has provided guidance and motivation to the investigator. This practice has enabled the researcher to identify the limitations, barriers, and gaps and has also facilitated to improve upon them.

Steps-3: Analysis of Syllabus

- Researcher analysed the syllabus of Library and information science of universities conducting Bachelor and Master Degree level courses in Library and information science in India, that is the basis to know the similarities and differences of course content on digital library courses/programmes.
- The study takes into consideration Indian universities (Central, State and deemed universities) registered and recognized by the University Grants Commission (UGC). As on 14 December 2020 UGC recognized 54 central

universities and 417 states universities (both funded and non-funded), besides 125 deemed universities declared by UGC as on December 14, 2020. At present, about 130 universities are offering LIS courses at Bachelor and Master level. Researcher checked each university's website to ascertain courses offered in Library and information science. The websites of many universities were not accessible, so many universities did not upload the syllabus. Finally, 52 LIS Schools were identified for the study. Further, the syllabus of LIS courses from the respective websites of universities offering the courses was retrieved and downloaded to determine the level of digital librarianship being taught after phrases like as "digital library" and "digital libraries" etc. were searched in their course contents. Analysis of this collected data is made and interpreted in the Chapter – 4.

- 52 LIS Schools identified
- Each University/Institute LIS Syllabus analysed
- Digital Library Component explored
- Collected data stored in tabular form
- A Blog also created for this purpose

Blog Address: <http://www.digitallibraryeducation.blogspot.in/>

Step-4: Analysis of Training and Other Professional Development Opportunities

Researcher has analysed the training and other professional development opportunities through reviewed the previous related literature, internet sources and Library & Information Science Forums of National and International Level.

I. Worldwide Framework of DL Education and Training:

- The data was collected through email announcement by DIGLIB Forum (Digital Library Research mailing list).
- The DIGLIB mailing list is being handled by IFLA for librarians, information scientists, and other information professionals to share information about the many issues and technologies pertaining to the creation of digital libraries As well as data was collected from searching on internet with some selected

keywords as ‘digital library education’; ‘online courses’; ‘digital library courses’; ‘E-learning’; ‘MOOCs’ etc.

- Then identified selected websites and searched relevant data on it. Data was also collected through the review of relevant literature on ‘digital library education’ initiatives and then identified various learning or training opportunities on digital library at international level. Analysis of this collected data is made and interpreted in the Chapter –3.

II. Continuing Education Programmes (CEPs) on Digital Libraries in India

- LIS-Forum is an e-mail-based discussion forum for library and information professionals in India. Discussion posts of LIS community from all over the country are available in its archive. The LIS-Forum started operations in 1994 for connecting library and information science professionals in India.
- The archived messages are available and accessible from April 2003 onwards in text and compressed Formats. The data for the study were gathered from the online archive of LIS-Forum (<http://ncsi.iisc.ernet.in/pipermail/lis-forum/search.html>).
- Messages posted to the mailing list during the sixteen-year eight months period (April 2003 – December 2020) have been studied. Total number of 124 posts were shortlisted from all monthly issues’ posts from April 2003 to December 2020, which were related to seminar, workshops, conferences, short-term training programmes or any issue related to continuing education on digital libraries or digital repositories.
- Repeat or duplicate posts were not accounted for. The contents of each message were studied and the observations on each post were recorded in MS Excel. Analysis of this collected data is made and interpreted in the Chapter – 4.

Step-5: Analysis of Responses from Professionals Based on Research Instruments

- Based on online surveys, this study examines the challenges and opportunities in digital library education and training of LIS professionals in India.

- The major tool of collection of research data is “Research Questionnaire” which is based on past studies made on this/such area(s) with suitable inclusion.
- Two semi structured questionnaires have designed using Google forms and sent to selected respondents via email to know their opinion about the research problem.
- Target respondents were two types (i.e., teachers/faculty and students/learners of digital libraries) for the study.
- **Sampling:** According to nature of the study purposive sampling is suitable, so sample have choose only based on purpose and requirement of the study.

“Purposive sampling (also known as judgment, selective or subjective sampling) is a sampling technique in which researcher relies on his or her own judgment when choosing members of population to participate in the study.”

I. Selection and Criteria of LIS Teachers/ Experts of Digital Library

A semi structured questionnaire using Google forms was designed and sent to emails of selected respondents (LIS teachers/experts of digital library) to know their opinion about the research problem. Researcher has searched each University websites, where Library and information science courses are running and collected LIS faculty members contact details from there. According to nature of the study purposive sampling was suitable and used, so respondents were chosen based on purpose and requirement of the study. Respondents having one of the following attributes were selected:

- Any working faculty member of Library and information science in any Indian University.
- Resource person in any training programmes on digital libraries from any university/ Institution/ Association;
- Who have published any papers on digital libraries in any library and information journals;
- Who have developed any digital library projects.

II. Selection and Criteria of LIS Students/ Participants of Digital Library Education and Training

Researcher designed a simple pre-questionnaire using Google forms to identified target respondents (LIS Students/ participants of digital library education and training), which were asked “Have you participated in any BASIC-training programme (seminar/conference /Workshop/ short term training course, etc.) in digital libraries ever before? Or Have you learned about digital libraries during BLIS/MLIS at the University level? (Yes/No)”.

This pre-questionnaire circulated to LIS professionals through social media (Facebook and WhatsApp groups). Total 977 responses received with reply of the above asked question in “Yes” and “No”.

As 382 responses were received with “No” that means they had not participated in any basic education and training programme in digital libraries and total 595 responses were received with “Yes” that means they had participated in any basic education and training programme in digital libraries.

Researcher sent final research questionnaire to those 595 target respondents for collection of data from LIS students/ participants of digital library education and training regarding objectives of the study. From the selected target respondents, 200 responses have received, that analysed and interpreted in Chapter – 5.

Step – 6: Data Analysis and Interpretation

- The data collected out of questionnaires from both faculty/teachers and students/ learners have analysed and presented in the form of tables, figure-charts, and diagrams etc.
- Microsoft Excel, Word and JASP software is used for research data analysis.
- The data collected have analysed and interpreted in the Chapter-5.

Step – 7: Referencing Tools

- Reference or bibliography is an important part of the research.

- References at the end of all chapters throughout the research have been made in American Psychological Style (APA)-7th edition using **Zotero** reference management software.

1.10 Scope of the Study

Digital library is a very broad area. There are many issues and problems under the digital libraries for purpose of the study or research, Such as: Digital preservation, Digital Library Services, Data & Knowledge management, Users Satisfaction & awareness, Accessibility, Ability of Library professionals, Networking and other technical issues. But this study is limited to only area of **digital library education and training in India**. Area of digital library education and training is more sustainable for study in the present scenario.

1.11 Organization of the Thesis

The present thesis is organised in six chapters in order to maintain the flow of thoughts and ideas.

Chapter - 1: Introduction

The first chapter is the introduction chapter, which provides a background for the study and the need for the research. The concepts of digital library and its history and development are introduced and the objectives, methodology, significance, and the scope and limitations of the study are included in this chapter.

Chapter - 2: Review of Literature

The second chapter consists of the literature review, which involves the compilation of relevant secondary research data. In this chapter researcher consulted background material such as relevant books, journals, conference proceedings, online web sources and other reference material.

Chapter-3: Digital Library Education and Training: A Worldwide Framework

This chapter provides a glance of the digital library education & training framework in the global perspective.

Chapter-4: Digital Library Education and Training Opportunities in India

In this chapter an attempt is made for exploring and analysing different types of opportunities for digital library education and training. This chapter focuses on analysing syllabus of Library and information science Departments of universities those are conducting Bachelor and Master Degree level courses and information science

Chapter-5: Responses of LIS Professionals (Data Analysis and Interpretation)

The collected data from questionnaires is analysed and interpreted in this chapter. The data is tabulated or presented graphically wherever necessary along with the interpretation. This chapter is divided into two parts:

Section – I: Survey of Faculty / Experts of Digital Libraries

Section – II: Survey of Students / Learners of Digital Libraries

Chapter-6: Findings, Suggestions and Conclusion

A detailed discussion of the results is provided in the sixth chapter, along with the findings of the study, conclusion and suggestions for future research related to the study.

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CHAPTER – 2

REVIEW OF LITERATURE

2.0 Introduction

Review of Literature is the important part of the research. It presents an overview of the research problem. It gives an orientation to what is already known, provides a source of research thoughts and information on the research to be used and it helps to develop a conceptual framework of the study. Related literature collected from many different sources. Most of literature collected from online media using by Google Scholar, Emerald Insight, IEEE and Elsevier database, Library Information Science & Technology Abstract (LISTA), DOAJ, conference proceedings, and subject specific peer- reviewed journals on digital library, which was available in digitalized and print format.

2.1 Important Journals and Conferences on Digital Libraries

Based on a literature search of researches on digital libraries, the following journals are identified for literature and contents on digital libraries (Table 2.1). Pomerantz et al. (2006) has also identified major journals on digital libraries.

Table – 2.1: A List of Recommended Journals for Literature on Digital Libraries

S. No.	Name of Journal
1.	<i>Annals of Library and Information Studies</i>
2.	<i>Annual Review of Information Science and Technology</i>
3.	<i>Ariadne</i>
4.	<i>Communications of the ACM</i>
5.	<i>DESIDOC Journal of Library & Information Technology</i>
6.	<i>Digital Humanities Quarterly</i>
7.	<i>Digital Library Perspectives</i>
8.	<i>D-Lib Magazine</i>
9.	<i>e-Library Science Research Journal</i>
10.	<i>First Monday</i>
11.	<i>IATLIS Journal of Library Education and Research</i>
12.	<i>IFLA Journal</i>
13.	<i>Information Processing & Management</i>
14.	<i>International Journal on Digital Libraries</i>

15.	<i>Journal of Digital Information</i>
16.	<i>Journal of Documentation</i>
17.	<i>Journal of Education and Practice</i>
18.	<i>Journal of Information Science</i>
19.	<i>Journal of Librarianship and Information Science</i>
20.	<i>Journal of the American Society for Information Science and Technology (now Journal of the Association for Information Science and Technology)</i>
21.	<i>Library Hi Tech</i>
22.	<i>Library Philosophy and Practice (e-journal)</i>
23.	<i>Library Review</i>
24.	<i>New Library World</i>
25.	<i>OCLC Systems & Services</i>
26.	<i>Program: Electronic Library and Information Systems</i>
27.	<i>The Electronic Library</i>
28.	<i>The Journal of Academic Librarianship</i>
29.	<i>Webology</i>
30.	<i>World Digital Libraries: An International Journals</i>

Also, many worlds class digital Library conferences have been organized from time to time in different parts of the world. A list of major conferences on digital libraries is given in Table – 2.2.

Table – 2.2: A List of Major Conferences on Digital Libraries

S. No	Name of Conference	Website
1.	<i>International Conference on Theory and Practice of Digital Libraries (TPDL)</i>	http://www.tpdL.eu/
2.	<i>ACM/IEEE-CS Joint Conference on Digital Libraries (JCDL)</i>	https://www.jcdL.org/
3.	<i>IATLIS National Conference</i>	http://www.iatlis.org/conferences.php
4.	<i>Texas Conference on Digital Libraries (TCDL)</i>	https://www.tdl.org/tdl-events/tcdL/
5.	<i>International Conference on Digital Libraries (ICDL) by TERI</i>	https://www.teriin.org/events/icdl/
6.	<i>European Conference on Digital Libraries</i>	http://ecdLconference.isti.cnr.it/
7.	<i>International Conference on Asia-Pacific Digital Libraries</i>	https://icadL.net/
8.	<i>Asia-Pacific Conference on Library & Information Education & Practice (A-LIEP)</i>	-

2.2 Relevant Aspects of Collected Literature on Digital Library Education and Training

All relevant studies which based on various aspects of digital library education and training have been reviewed and categorized with the following broad theme headings according to the nature of the research:

1. **Need and Importance of Digital Libraries**
2. **Education and Training on Digital Libraries**
3. **Retraining Need for LIS Professionals**
4. **Challenges for Digital Library education and training**
5. **Opportunities for Digital Library education and training**
6. **Competencies Development of Digital Library Professionals**

“Education is the most powerful weapon which you can use to change the world.”

(Mandela, 1990)

Literature has been reviewed under the above six broad theme headings summarized with their main focus and key aspects of the study.

2.2.1 Need and Importance of Digital Libraries

Table 2.3 shows various key aspects of the reviewed relevant studies on the broad theme of *“need and importance of digital libraries”*:

Table – 2.3: Key Aspects of the Studies: Need and Importance of Digital Libraries

Author(s)	Key aspects of the study
<i>Borgman (2001); Anasi (2012); Thong et. al. (2004); Ash et al. (2018); Ogunsola (2011); Paul and Singh (2014); Trivedi (2010); Joint (2006); Aqili and Moghaddam (2008) Cushing and Shankar (2018), and so on</i>	<ul style="list-style-type: none"> • <i>Librarian’s role and need in digital libraries</i> • <i>Benefits of digital libraries to higher education in the 21st century</i> • <i>Factors to user acceptance of digital library</i> • <i>Relationship between digital and traditional libraries.</i> • <i>Future of the library profession in digital environment.</i> • <i>Advantages of digital libraries</i> • <i>Digital curation knowledge, skills, needs and challenges</i>

- Borgman (2001) described role of digital librarians in digital libraries. Digital libraries provide wide opportunities for making maximum information available to maximum users in maximum number of modes in maximum number of places in areas of maximum duration. Anyone can browse, use search, and generate current resources of information from any place. In this digital library system, researcher pointed out some questions that “Can digital libraries provide necessary or sufficient services to satisfy most information needs? Can we or should we do without the librarian in digital libraries? Alternatively, what roles can or should librarians play in digital libraries?” He suggested other job titles of modern librarian that are “information architect,” “digital asset manager,” or “content specialist”.
- Anasi (2012) explored in his paper the advantages of digital libraries to advanced education in the 21st century. His study highlighted the fact that digital libraries are critical and essential for effective teaching, research, and learning. He mentioned the significant role of digital libraries that are reduction of the digital divide, improved use of information, improved collaboration, timely access to information, improved facilities for information sharing, improved searching, and manipulation of information, and so on.
- Thong et. al. (2004) reported on findings from an extensive research programme into user acceptance of an award-winning digital library in Hong Kong. An outcome of this research is the identification of nine important factors that may lead to greater user acceptance of digital libraries. All nine factors are categorized into three categories (I) Interface characteristics: 1. Terminology (The words, sentences, and abbreviations used by a system) 2. Screen design (The way information is presented on the screen) 3. Navigation (The ease with which users can move around the system) (II) Organizational context: 4. Relevance (The match between the system content and individual user’s information needs) 5. System accessibility (The ease with which people can access specific systems) 6. System visibility (Observability or degree to which the results of an innovation are visible and communicable to others), and (III) Individual differences: 7. Computer self-efficacy (Individual judgment of one’s capability to use a new system) 8. Computer experience (Exposure to different types of applications and familiarity with various software packages) 9. Domain knowledge (Users’ knowledge of the subject domain). Authors

recommended these factors to identified as important predictors of increased usability of digital libraries because digital libraries will be able to entice more users to discover and adopt them.

- Ash et al. (2018) described various benefits of digital libraries in higher education. The deployment of higher education digital libraries serves as a catalyst for progress in this domain. In a networked world, digital libraries facilitate the development of an educational community that shares thousands and thousands of digital resources. Therefore, digital libraries promote the sharing of resources among members of a scholarly community. These advantages include free flow of information resources, easier access to information resources, maximization of information resources, faster provision of user support for information and literature, avoidance of duplication of effort and mutual sharing of local publications.
- Ogunsola (2011) discussed in his paper that the relationship between digital and traditional libraries. He recommended way provide enhanced access to national and international library and information resources and to share locally available resources with libraries all over the world using digital technology.
- Broering (1998) stressed on importance of digital libraries that benefits are the low cost and time saving factors of endlessly searching and stumbling around looking for information; saving of production costs of printing; accessibility of unimaginable library services and so on.
- Trivedi (2010) in his paper pointed out the advantages of digital libraries, are:
 1. nearly unlimited storage space at a much lower cost;
 2. Re-allocate funds from some staff, collection maintenance, and additional books;
 3. No physical boundary;
 4. Round the clock availability;
 5. Multiple access;
 6. Enhanced information retrieval;
 7. Preservation for some print material;
 8. Added value;
 9. Universal accessibility etc.
- Joint (2006) focused in his paper the future of the library profession in digital environment. Library and information science (LIS) practitioners are often asked whether the advent of digital library technologies threatens their professional existence.
- Paul and Singh (2014) examined in their paper the aims, significances, and principles of digitization. The main goal of digital libraries is to provide greater

access to digital collections of all disciplines to promote research activities. They identified following characterizations of digitization: 1. Information accessibility; 2. Improved searching; 3. Timely access; 4. Improved access; 5. Improved display; 6. Potentiality of quality and speed; 7. Preservation of resources; 8. Space saving; 9. Sharing of resources.

- Aqili and Moghaddam (2008) focused in their paper on several dimensions of the digital divide that pertain to service as well as the responsibilities of libraries. They identified the role of library and information professionals in the third millennium or in current digital information environment.
- Long and Applegate (2008) discussed on importance of continuing education activities that have improve their digital library skills, sources of the training (for example, informal discussions, conference programmes, and so on), other activities that helpful in improving their understanding and skills and additional expertise training in the area of digital library. Researchers identified following different continuing education opportunities: non-credit course (in-class, online, or distance); professional association workshop (in-person or online); professional association conference programme; webcast or Web conference; teleconference or videoconference; reading professional literature; informal discussions with colleagues and, e-mail discussion lists. As well as researchers evaluated following different topics related to continuing education for future digital libraries: Information retrieval, Website design, Imaging/scanning, User interface design, Digital archiving, Semantic Web, Database design, Digital cataloging, Metadata, Programming/scripting languages, Markup languages. The study suggested some potential guidelines of future research in area of digital library education. One is a comparison of the continuing education (CE) attitude of librarians getting their library degrees post-1995 with those of the bridge generation. Another is to build upon the by-age analyses in this study and establish at what age or career point continuing education (CE) generally becomes most desirable. Findings of the study were that bridge generation librarians are making an effort to keep their technical skills up to date. It is also apparent that they realize there is much more to learn. Professional associations and library schools have an important role to play in providing

this training. Because bridge generation librarians find deep learning opportunities these organizations can supply among the most helpful.

- Cushing and Shankar (2018) discussed in their paper about the educational programme in Ireland for the skills, knowledge, needs and related challenges in selecting, protecting digital assets. The study found that there is a deficiency of understanding about digital curation and information professionals struggling to educate for digital curation skills in Ireland. The study also provides an opportunity for the authors to consider how the local environment influences educational outcomes, an issue that may be evident to educational scholars but isn't often addressed in areas like professional and post-professional education and continuing professional development education. Researchers suggested that we should go forward in construction and developing our own research-based education and training programmes in digital libraries.

2.2.2 Education and Training on Digital Libraries

Table 2.4 shows various key aspects of the reviewed relevant studies on the broad theme of “*education and training on digital libraries*”:

Table – 2.4: Key Aspects of the Studies: Education and Training on Digital Libraries

Author(s)	Key aspects of the study
<i>Bawden (2004); Tammaro (2007); Sarcacevic & Dalbello (2001); Pomerantz et al. (2006); Coleman (2002); Koltay and Boda (2008); Ma et al. (2006); Nguyen and Chowdhary (2013); Batool and Ameen (2010); Kavulya (2007); Karisiddappa (2004); Audunson and Shuva (2016);</i>	<ul style="list-style-type: none"> • <i>Determine and compare approaches to the education and training of librarians for work in digital libraries</i> • <i>The trends for digital library education in Europe</i> • <i>Rationale and orientation for digital library education</i> • <i>State of the art in the digital library education in Library and information science: Worldwide and Indian context</i> • <i>Digital library (DL) knowledge mapping</i> • <i>Digital library skills for LIS professionals and students</i> • <i>Priority areas of training and critical IT skills required by LIS professionals and competency requirements</i> • <i>Various areas of education for digital librarians</i> • <i>Digital library curriculum at international and national level</i> • <i>Trends and issues of digital library education globally</i>

<p><i>Myburgh and Tammaro (2013); Shem (2015) and so on.</i></p>	<ul style="list-style-type: none"> • <i>Present status of education and training and future model curriculum framework for digital libraries in India</i>
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- Bawden (2004) in his paper attempted to evaluate and contrast methods to librarian education and training for employment in digital libraries of two countries, the UK and Slovenia. Both formal education and continuing professional development (CPD) training are being adapted to explain the various aspects of the digital library environment both in the UK and Slovenia. This is going on as part of the ordinary technique of restructuring degree courses and training programmes. Existing needs for maintaining digital libraries that the skills and expertise of digital libraries which combine logical, semantic, syntactic, and technical aspects.
- Tammaro (2007) He summarised some of the transformations to be expected according to libraries become progressively digital. In his study, he looked at the current state of digital library education in Europe. It answers two questions: what are the responsibilities of digital librarians and what are the responsibilities of digital librarians? What kind of education should they receive? He highlighted three approaches to digital library education: the rise of the notion of "memory institutions," the library-based approach to knowledge management, and the separation of IT from LIS schools.
- Sarcacevic & Dalbello (2001) examined in their paper the rationale and orientation for digital library education. In this paper they explored the three questions in an analytical way and with the 'real world' as a primary source. Those were: Why teach digital libraries? What to teach about digital libraries? And how to teach about digital libraries? They suggested several models that have emerged in the teaching of digital libraries and in incorporation of relevant topics into various curricula.
- Pomerantz et al. (2006) assessed the current level of digital library education in the field of library and information science. by the identifying the reading that are assigned in digital library courses and the topics of the readings. Their paper is an effort to identify how the topic of digital libraries is being taught in library and information schools. They found in the study that there is no core

set of reading assigned in digital library courses. Digital library related topics are central too much of the curriculum in LIS programmes. Study analysed the beginning phase of the curriculum development of digital library related topics. Authors developed “5S” theoretical model for understand the digital libraries. In which formal model “5S” are ‘Streams’, ‘Structures’, ‘Spaces’, ‘Scenarios’, and ‘Societies’. 5S captures the things and media involved in digital libraries. Modules of digital library according to the 5S model are: 1. Streams: Collection Development and 2. Digital objects/ Composites/Packages, 2. Structures: Metadata, Cataloguing, Author submission and Architecture, Interoperability, 3. Spaces: Data visualization, 4. Scenarios: Services, 5. Societies: Intellectual property rights management, Privacy, Protection, Social issues / Future of DLs and Archiving and Preservation. In their study they identified that digital library related topics are central to much of the curriculum in LIS programmes, and are addressed in many courses across the curriculum. Authors developed curriculum framework model for digital libraries. Whole digital library curriculum framework divided into two semesters as following sub topics:

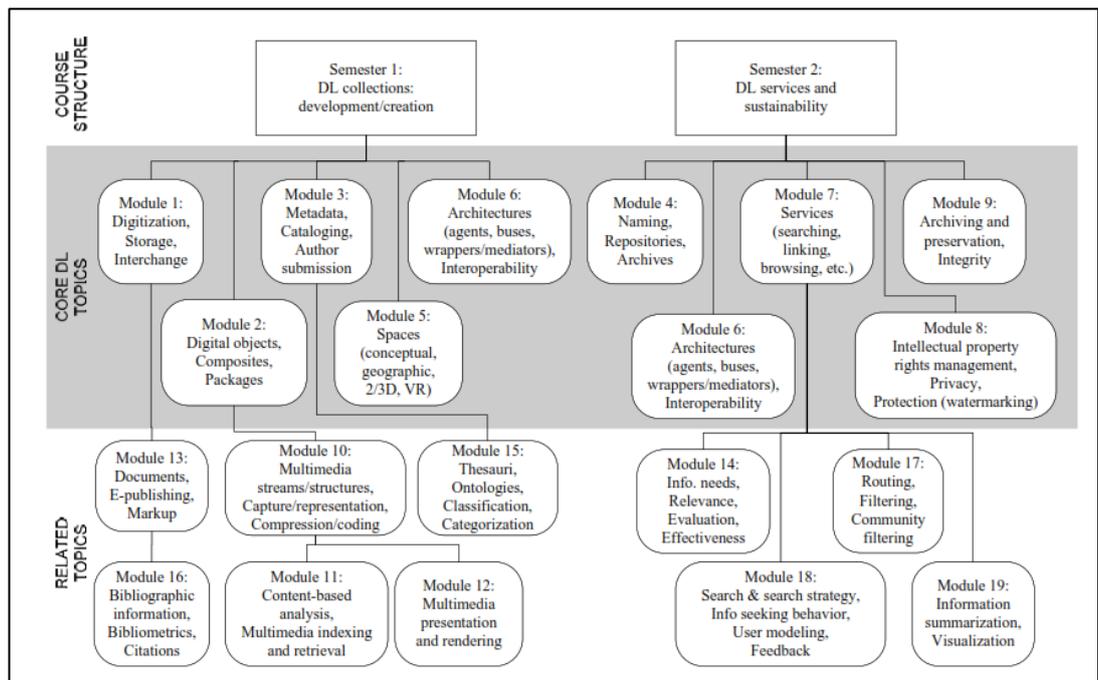


Figure 2.1: Curriculum Framework Model of Digital Libraries

(Pomerantz et al., 2006)

- Coleman (2002) explored the state of education in digital libraries and curriculum planning documents from professional associations. The paper

proposed a modest plan for interdisciplinary in the LIS professional education based on a core area of LIS knowledge organization. The researchers concluded that the educational needs of digital libraries have been dictated by computer science and suggest a framework around the integrative topics of digital libraries concepts, content, creation, organization, technology, access, preservation, management and the context.

- Koltay and Boda (2008) presented in paper the detail picture of digital library education taken in comparison with international experiences. They found that curricula follow international patterns in the literature. The content of education is up to date and is adjusted to the quickly developing world of digital libraries.
- Ma et al. (2006) studied the present state of digital library teaching at library schools of UK, USA, and Canada. They found that the number of universities offering digital library education programmes or courses is constantly growing. And, there were increasing opportunities for funding to develop new initiatives in digital library education. They suggested that a ‘Standard’ digital library educational modal is likely to be based on a combination of theoretical knowledge and real working experiences in digital libraries.
- Nguyen and Chowdhary (2013) conducted a digital library (DL) knowledge mapping study that created a knowledge map of 21 core topics and 1,015 subtopics for two decades (1990-2010) reflecting research in the digital library domain was published. They found that Scopus published a total number of 7,905 bibliographic records on “digital library” publications between 1990 and 2010. The authors introduced the knowledge map and recommended that the scientific order should be applicable to any digital library research, education, and practice activities in which (a) the researchers can use the map as a knowledge base to guide, design, and conduct their research with outputs as publications (papers, research monographs, text books, etc.), by which (b) the educators can design and develop their curricula and build knowledge and skills for digital librarians and researchers and (c) professionals can perform their activities using these evolving tools, technologies, standards, and guides.
- Batoool and Ameen (2010) studied Punjab University librarians in Pakistan on their different aspects. They found that while all librarians had word-processing abilities, the absence of curriculum coverage, the absence of revised courses, and

the absence of training workshops were major constraints on learning technology. These are all the consequences of inadequate LIS curricula that do not provide digital library education to include digital library skills for graduates.

- Oh et al. (2015) reported in their paper on a digital library curriculum field test. They said the modules were well-designed to teach students about significant subjects and challenges in digital libraries in general.
- Kavulya (2007) assessed in his paper the status of training of Library and information science (LIS) professionals in Kenya. He identified priority areas of training and critical IT skills required by LIS professionals and competency requirements. He observed that there was that time training programmes in the country didn't sufficiently address that job market requirements due to inadequate teaching resources at LIS training; lack of adequate ICT content in the courses; inadequate length of courses and inadequate industrial attachment for LIS students. They highlighted that the field of Library and information science (LIS) is highly dynamic and therefore there is a need for current information resources to support teaching and learning.
- Karisiddappa (2004) discussed in his paper that the advantages and disadvantages of LIS education scenario in the developing countries and stressed the need for model curriculum for current trends of LIS education. He highlighted that the education and training programmes in Library and information science must make a provision to prepare the professionals to assume the pro-active role in coping with new technology and the information explosion.
- Abubkar and Hassan (2013) discussed in their paper that the concepts of e-learning and curriculum development. This paper has reflected on the benefits and strategies for developing an e-learning curriculum in LIS schools in the Muslim world. It also discussed the likely challenges and prospects of e-learning programmes in the LIS schools. Concluded that it is obvious and evident from the forgoing discussions and accounts, that e-learning has grown extensively in recent year to become a new approach to instruction of LIS education in the Muslim world.
- Bakar (2009) discussed in his paper that there have been a small number of studies related to the library and information science (LIS) curricula over the years. As digital libraries are emerging as an important area of research and

practice in the creation of digitized collections there has been a small stream of studies on digital library education based on LIS curricular.

- Quan Liu (2004) investigated in his paper the state of education for digital libraries. For this study, a web survey was conducted of syllabi of courses on the subject of digital libraries (DL). His survey examined for questions: 1). which universities/colleges are offering DL courses? 2). what are the primary emphases in courses that explicitly address the subject of digital libraries? What issues and subjects are covered in the DL courses? 3). what are the differences and similarities in the courses? 4). Where does professional education lead our new librarians? He had founded from his study that not all the course contents are up-to-date in the field of library and information technology.
- Abrizah et al. (2009) in their paper examined the course offerings in digital library (DL) education, research question was: “What do the library and information science (LIS)- accredited programmes inform us about education in digital libraries?” researchers analysed Digital Library education which is included in the curriculum of 13 accredited and highly-rated library schools. They found in their research that a significant DL content is present in the curriculum; and the inclusion is categorized into (a) an independent or full digital library course, (b) an integrated digital library course with other LIS topics, and (c) courses with close relation to DL processes.
- Chiware (2007) looked at the current literature on digital library education and training and sought to describe the training needs for long-term digital project implementation.
- Baro (2010) analysed the status of digital library education in LIS schools of Africa, and the readiness of library schools to produce future digital librarians in Africa. They adopted survey approach as methodology in two parts: first, a survey of web sites maintained by library schools was conducted to identify any DL course offered and to analyze the course contents, followed by e-mail message. Researcher found from this survey that only a few library schools offer courses specifically related to digital library schools. Many library schools have not developed course on digital library.
- Berry (1996) explored some new digital library initiatives with worldwide implementation. He introduced the various digital library initiatives and projects

of the US National Digital Library, University of California, Stanford University, University of Illinois, and The Library of Congress.

- Spink and Cool (1999) discussed in their article the status of digital library education. It reported findings from an international survey of Library and information science (LIS) and computer science faculty, and websites, regarding digital libraries courses and curriculum at their institutions. He analysed that few schools offered courses specifically in digital libraries. While many schools have not developed Digital Library (DL) courses, they are aware of the need to develop curriculum as per digital libraries acceptations.
- Tibbo (2015) said that education for digital curation is very different today in their research entitled “Digital curation education and training: from digitization to graduate curricula to MOOCs”. He suggested that better collaborations between LIS schools and digital repositories is much needed to digital curation training. Funding agencies (such as Institute of Museum and Library Services (IMLS), United States, the JISC, UK, and the European Commission (EC), Europe) are playing major role in developing digital and data curation training programmes.
- A book by Myburgh and Tammaro (2013) discusses several areas of digital library education including curriculum design, education techniques and teaching methods, research on DL education, Competencies and skills, role of digital librarians and the upcoming role of LIS professionals.
- Audunson and Shuva (2016) analysed present digital library curriculum contents of LIS schools in Europe. It is found that most of European LIS schools have integrated the DL concepts in their curricula. Study found that there are lack of core DL textbooks and journals for DL courses in Europe. Textbooks and journals of digital library in English language were recommended also. It is assumed that in future modern technologies will have high influence on LIS curricula. To enhance of DL education there is need of collaboration among different disciplines and conducting cooperative programmes among different disciplines including computer science, management, culture science, and so on. The study emphasized to incorporate following important subject areas into consideration developing LIS curricula in special context of digital library curricula (Table – 2.5):

Table – 2.5: Subject Areas for Considering in Digital Library Curricula

• <i>Digital library planning and project</i>	• <i>Development of electronic resources and collection</i>
• <i>Metadata studies</i>	• <i>Hardware and software fundamentals course</i>
• <i>Digital archiving</i>	• <i>Database management system</i>
• <i>Digitization</i>	• <i>Information retrieval</i>
• <i>Copyright and Intellectual property right</i>	• <i>Cataloguing and classification</i>
• <i>Searching for information</i>	• <i>Content mediation from digital libraries to users</i>
• <i>Community and political role of information and libraries</i>	• <i>User studies</i>
• <i>Automated I & A (Indexing and abstracting)</i>	• <i>Knowledge and information management</i>
• <i>Gaining knowledge of digital library software such as DSpace, Greenstone, Fedora, and others.</i>	• <i>Internet studies</i> •
• <i>Marketing of information services and products</i>	• <i>Research methodologies in LIS</i> •
• <i>Information society and libraries</i>	• <i>Reference services</i>
• <i>Human resources management</i>	• <i>Information and cultural studies</i>

- Shem (2015) conducted a global assessment on digital library education trends and challenges. The study recommended towards developing countries that developing countries should be made necessary plan to training of faculty and introduce scholarship and fellowships for encourage digital library education, LIS departments should be encouraged to cooperate with other disciplines to build up their digital library courses and LIS schools should be run recognized, certificate, Diploma/ Undergraduate and Graduate degrees in Specialized digital library education. Adequate infrastructure, special programmes to attractive to students and any other requirements for running digital library education courses should be needed.
- Mostafa and Brancolini (2002) identified syllabus, related skills, model programme implementation approaches, and assessment methods for digital library education programme. They also discussed about challenges of digital library education programme development, sources of funding, and interdisciplinary and inter-institutional collaboration. Study found that gaining digital library education and training is a difficult prospect. Appropriate courses and understandings are usually distributed among diffident courses, streams and

organizations. Available programs are not completely full filled compulsory the theoretical and practical course content.

- Safi, Gul and Shah (2011) discussed on present status of education and training and future model curriculum framework for digital libraries in India. They identified a problem in digital library education in India that “A well knitted curricula being the foundation for a successful educational programme for an emerging and evolutionary area of digital librarianship after understanding the existing status of digital library education in LIS curricula at different levels. No serious and planned attempt has been made in India so far except enriching present curricula with some stray elements without any objective or schedule. Hence present study is an exploratory investigation to lay a foundation for more debate, discussion and comprehension on the area.” Researchers discussed and deliberated the following 10 curriculum modules for digital library courses: Module I: Architecture, Systems, Tools and Technologies, Module II: Digital Content and Collection, Module III: Metadata, Module IV: Interoperability, Module V: Standards, Module VI: Knowledge organization Systems, Module VII: User and Usability, Module VIII: Legal, Organizational, Economic & Social issues, Module IX: Project Report and, Module X: Field Report. The study found that there is an urgent need arises to reframe the LIS curriculum to complement it with digital library development. Implanting of digital library education in Indian universities can help to achieve the goal of enabling digital library use for e-learning. However, the analysis reveals that digital library education in Indian schools is not updated with developments in the field.
- According to Malik and Ameen (2017), Pakistan now offers LIS education in 11 universities, however the curriculum is outdated. that emphasizes more management than information and communication technology (ICT). In addition, the lack of technological ease, administrative incompetence and library professionals' digital skills are also counterproductive. The results illustrate the need for increased efforts to seek compatibility by redesigning and reorienting LIS curricula with international standards. The mission and vision statement, preparation and assessment are the areas in which the future survival of academic programs must be based in order to ensure the potential survival of academic programs, it is important to concentrate on that. Overall, the study result shows the need to make substantial efforts to seek compliance with international

standards by redesigning and reorienting the program. In addition, to inculcate rapid changes in the information world that is constantly in a state of flux, it is important to revisit the curriculum periodically.

- Okeji and Adebara (2020) evaluated the library school’s curriculum in Nigeria in order to equate it with the guidance on the provision of "digital libraries" course for Library and information science (LIS) guidelines at international and national level. This study included 31 universities offering LIS approved by the Commission of National Universities (NUC). Review of departmental records containing the LIS curriculum was the key instrument for data collection for the study. Second, there were interviews with several Library and information science educators from universities who had yet to incorporate the digital library course into their LIS curriculum. This study found that most library schools provide the "digital libraries" course or similar areas as a core course in their curriculum. Just a few library schools, however, have computer laboratories to develop digital library skills for students. Some LIS educators in library schools described problems in the LIS departments in Nigeria, such as the lack of trained information and communication technology (ICT) personnel to manage the course, coupled with the lack of computer laboratories equipped with modern computers with secure internet facilities. The findings from this study informed the revision of the curriculum and upgrade efforts to make the "digital libraries" core course and more emphasis should be placed on the availability of computer laboratories in LIS departments for the development of future ICT/digital librarians.

2.2.3 Retraining Need for LIS Professionals

Table 2.6 shows various key aspects of the reviewed relevant studies on the broad theme of *“retraining need for LIS professionals”*:

Table – 2.6: Key Aspects of the Studies: Retraining Need for LIS Professionals

Author(s)	Key aspects of the study
<i>Kibirige and Depalo (2001); Ramaiah and Moorthy (2002); Jain</i>	<ul style="list-style-type: none"> • <i>Urgent need to user-education programs</i> • <i>Impact of continuing education programmes on LIS professionals</i>

<p>(1999); Gbaje (2012); Sinha (2008); Edegbo (2011); Brown (2013); Shem (2015); IFLA/UNESCO Manifesto for Digital Libraries (2010) Tibenderana and Ogao (2008); Maroso (2005); Yadav and Gohain (2015), and so on.</p>	<ul style="list-style-type: none"> • <i>On-the-job training (OJT) needs for library professionals</i> • <i>re-training of librarians for the digital work environment</i> • <i>Digital library trends and issues globally</i> • <i>Acceptance and use of electronic library services in the University libraries</i> • <i>Current developments and changes of Library and information science education and training in India</i> • <i>Active planning for digital libraries at any level (national, regional and local)</i>
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- Kibirige and Depalo (2001) addressed in their study the critical need for user-education programmes that focus on the nature and kinds of digital collections, interfaces, hardware and software requirements, telecommunications access modalities, and making such programmes part of ongoing education. In the digital library environment, they highlighted the necessity for ongoing user education and training.
- Ramaiah and Moorthy (2002) focused in their research on the influence of continuing education programmes on librarians and information scientists. They stated that continuous education is defined as the availability of opportunity for people to learn more. Continuing education programs (CEP) for LIS professionals are necessary from time to time as the pressure on information professionals to stay current in challenging situations and maintain and enhance productivity grows. They revealed that CEP courses benefit LIS professionals by allowing them to stay current with new technologies, filling up gaps in their university education, and assisting them in obtaining promotions.
- Jain (1999) explored and identified in his article the necessity for on-the-job training (OJT) for librarians. Information technology, work orientation, customer service/public relations, marketing/publicity, refresher courses, and management skills were recognized as the most important on-the-job training needs for librarians. He recommended that the appropriate training should be provided according to a structured plan.
- Gbaje (2012) in his paper examined re-training of LIS professionals for the digital technological environment by the Nigerian Library Association (NLA).

He maintained 32 types of technologies or technological skills require for digital librarian. In his article, he stated that information workers must have a fundamental understanding of information technology in order to function in a digital world.

- Sinha (2008) highlighted in his paper that the concepts, definition and need of manpower planning, human resource development and manpower planning for library activities, continuing education programme (CEP) for preparing library professionals for managing digital library and information centres. And role of various national level library organization for imparting IT training for running modern libraries in network and digital environment. He concluded and suggested that proper HRD/ Manpower policies should be framed for continuing education and for in- house training and hands on experience for the LIS professionals to use modern technologies and electronic gadgets and give ICT based computerized and digital library services to the end users in networked and digital library environment.
- Edegbo (2011) stated in his study that there was considerable worry for library and information science courses to match the current digital society's library and information service needs.
- In IFLA/UNESCO Manifesto for Digital Libraries (2010) clearly mentioned that authorities should be aware that active planning for digital libraries at any level (national, regional and local) should cover the following issues: 1. Trained personnel; 2. Adequate buildings and facilities; 3. Integrated planning for libraries and archives; 4. Funding; 5. Target setting.
- Brown (2013) mentioned in his book chapter (page no. 284) that digital preservation skills will continue to form an increasingly large element of postgraduate LIS courses. This will be coupled by the availability of a much wider range of shorter training courses suitable for in-service staff training and continuing professional development.
- Shem (2015) carried out a study to explore the digital library trends and issues globally. Study points out that there is very need of revisit curricula to education and training LIS professionals, so that they compete as market demands. Education and training for digital libraries should be application based, professional type, useful for society, relevant to market place and work place and play practical role in build-up professionals for handling information and

knowledge for the society. DL training should be focused on skills, aptitudes, knowledge inventiveness and dissemination of information.

- Tibenderana and Ogao (2008) examined the acceptance and use of electronic library services in the University libraries. Authors focused on end-user training programmes. The finding of the study said that librarians need to be relatively active and effective in the providing of the services so that end-users get satisfied. It was found that the most noticeable issues that contributes to non-acceptance and users have lack of awareness for use of e-library services. It shows that the library services are not properly promoted and supported. There is a great need for librarians to improve a hands-on competent and active marketing of library services. Continuous training programmes send-users to improve their information searching skills. Users need the awareness of e-library services.
- Ippoliti (2019) discussed the role of librarians. Librarians have offered workshops and consultations for faculty for everything from designing effective research assignments, to scholarly impact, and open educational resources. Librarians can positively inform efforts to integrate open and critical pedagogy and scholarship into faculty development programming and into the curriculum.
- Maroso (2005) described the Illinois Digitization Institute's basics and beyond digitization training programme and also described that how successful the project's different training approaches have been. The Illinois Digitization Institute's Basics and Beyond digitization training programme and to describe how successful the project's different training approaches have been. There is no doubt the need for effective training is out there, and is necessary around the country and around the world. There are many very good digitization education programmes offered in a variety of formats, but now the question has to arise of "What else can we do to prepare institutions to successfully carry out these projects?" There are several steps that should be taken to further improve digitization training and to reach even wider audiences. First, the training needs to go beyond just targeting digital imaging (i.e., the conversion of materials like books, manuscripts, photographs, and slides) and provide specific training for the conversion of audio and video. Finally, there is a need for permanent funding for national digitization training or feasible profit-making training models which encompass a range of different education and training opportunities. Many of

the current initiatives are supported by grants, and we all know that grant money runs out eventually.

- Yadav and Gohain (2015) discussed on the current developments and changes of Library and information science education and training in India. The study described beginning of LIS education; LIS education during from independence to 2014; and emerging trends of LIS education in India.
- Russell (2007) highlighted that training need is very important to preserving, managing, and building digital collections. Many agencies developed guidelines for encouraging organizations to build their digital collections with trained personnel in US. The study evaluated the issues and challenges faced by Northeast Document Conservation Center (NEDCC) to their continuing education programme (during 1995 to 2005) for digital collection management as the experience level of professions in the field advances very fast. Concluding remarks was that education and training for digital libraries occur as one of the greatest challenges of the 21st century as libraries change to a progressively digital environment.
- Ojedokun and Moahi (2007) explored the use of digital library skills and attitude of employment preparation for the growing information science environment in Botswana. The findings suggested that not all of the digital library skills are used and that the emergent information market, although still located in the traditional library or information unit, includes elements related to networks and distributed information systems. LIS students felt that they have been adequately prepared for the market, although some feel that they would have been more prepared if the training had also been practical, as opposed to being theoretical.
- According to the IFLA (2012) “Guidelines for Professional Library/Information Educational Programmes – 2012”, The library and information education programme should be part of a degree-granting institution, and tertiary (university) level instruction should be offered. The goal of the IFLA's guidelines is to provide library and information studies/science (LIS) schools around the world with a set of guiding principles of preferred practice to use when developing and operating their educational programmes. Professional organisations in the LIS in many countries are obliged to establish educational policy statements that LIS institutions must follow, especially for accreditation purposes.

2.2.4 Challenges for Digital Library Education and Training

Table 2.7 shows various key aspects of the reviewed relevant studies on the broad theme of “*challenges for digital library education and training*”:

Table – 2.7: Key Aspects of the Studies: Challenges for Digital Library Education and Training

Author(s)	Key aspects of the study
<p>Rosenberg (2006); Cleveland (1998); Makori et al. (2015); Okello-Oburra and Kingongo-Bukenya (2011); Mohsenzadeh and Moghaddam (2011); Ani (2005); Behra and Singh (2011); Dasgupta (2009); Halder (2009); Hashim et al. (2012); Saracevic (2000); Mac-Ikemenjima (2005); Khan & Bhatt (2016); Mohsenzadeh (2010); Baro and Eberechukwu Eze (2013); Satpathy and Maharana (2011) and so on</p>	<ul style="list-style-type: none"> • <i>Important issues and challenges of development of digital libraries</i> • <i>The key problems are the absence of purchasing and maintenance funds and e-resources, along with the absence or retention of qualified library personnel.</i> • <i>Practical issues of implementation of institutional repositories (IRs) in Africa</i> • <i>Trends and challenges in Library and information science education in Uganda</i> • <i>Perceptions of library staff regarding challenges of developing digital libraries</i> • <i>Lack the requisite skill to function in the digital library environment.</i> • <i>Problems and challenges in education, training and collection development of digital libraries in India</i> • <i>Present scenarios of LIS profession and the changing environment</i> • <i>Issue, trends and challenges in preparing digital library professionals</i> • <i>Issues and challenges of LIS professionals in developing digital libraries</i> • <i>Shortages of time and insufficient training opportunities, librarians face difficulties in acquiring digital skills</i>

- Cleveland (1998) highlighted in his paper on some important issues and challenges of development of digital libraries. That are related to technical architecture; building digital collections; skills of staff; digitization; metadata; naming, identifiers, and persistence; copyright / rights management;

preservation etc. According to them, libraries all around the globe have been working on this formidable set of issues for some years.

- Rosenberg (2006) reported some finding from a survey related to digitization in university libraries in sub-Saharan Anglophone Africa. As a consequence of the study, two thirds of libraries found the absence or retention of qualified library personnel to be an obstacle comparable to that of a lack of funding. While there has been modest growth across the continent in terms of digital libraries, it has been uneven, significant achievements can be recorded by many university libraries in Africa: facilitating access to electronic resources, increasing internet knowledge and training in its usage, as well as providing ICT infrastructure and network connection. The key problems are the absence of purchasing and maintenance funds and e-resources, along with the absence of retention of qualified library personnel. Continued funding agency assistance, both financially and in the form of knowledge, is critical, and it must be tailored to meet the specific needs of each library. As a result of this study, INASP (International Network for the Availability of Scientific Publications) is launching a new initiative to support curriculum changes in library schools to train competent LIS professionals for the modern digital world, as well as a programme to support and management of a range of e-services, e-resource, and research projects.
- Makori et al. (2015) identified the practical problems of institutional repositories (IRs) deployment in Africa in their study. The need for education and training to raise customer awareness, as well as user education, staff training, and improved marketing techniques on the side of management, were all highlighted. Education and training of students, faculty and staff is one of those strategies that is indeed very effective in informing and creating long-lasting positive impression of repositories and interventions for challenges. This study provides relevant information on the need to education users on the value of IRs and address training opportunities
- Okello-Oburra and Kingongo-Bukenya (2011) discussed in their paper the trends and challenges in Library and information science education in Uganda. They described some following important challenges in LIS education and training (in Uganda): 1. Lack of Adequate Education and Training Schools; 2. Lack of Adequate LIS educators; 3. Lack of appreciation by Policy makers; 4.

Lack of mentorship strategies for young and junior authors; 5. Standardization of LIS programmes; 6. Technology infrastructure at LIS schools; 7. Lack of Information Literacy; 8. Changing enrolment; 9. Challenges of the “Fourth Role” of LIS schools: Financial Management; 10. Continuing education for LIS school members. They recommended that as LIS education and training seeks a wider role in society, there is a need to prepare students for careers in a rapidly changing world. This requires multidisciplinary education, greater emphasis on core knowledge and fully well-articulated graduate programmes to meet the requisite of LIS professionals.

- Mohsenzadeh and Moghaddam (2011) identified in their paper the perceptions of library staff regarding challenges of developing digital libraries in the seven branches of Islamic Azad University (IAU), Iran. They identified the most important difficulties from the librarian’s perspective was the lack of enough equipment and untrained personnel and a lack of sufficient training programmes. They also highlighted that the problem had mainly arisen from the managing authorities, who have not paid enough attention to improving the required skills of their staff.
- Ani (2005) stated in his article, that librarians in Nigeria have inadequate ICT abilities and that most of them lack the necessary skills to work in a digital library environment.
- Behra and Singh (2011) attempted in their paper to identify the problems and challenges of collection development of digital libraries in India. They mentioned in their paper the problems of collection development in digital era: 1. Problems of user-friendly environment; 2. User training; 3. Digital divide; 4. Library classifications; 5. Staff development approach and Challenges of regarding for the same were: 1. Challenges in collection development in electrically; 2. Technological Up gradation; 3. Financial constraints for collection development; 4. IT skill manpower; 5. User service etc.
- Dasgupta (2009) focused in his study the issues of Library and information science (LIS) education in India. He identified that: 1. Non-existent of accreditation bodies; 2. Emergence of new LIS schools; 3. Insufficient Faculty Strength; 4. Lack of proper library facilities; 5. Curriculum updating; 6. Inadequate physical facilities; 7. Little attention for selection criteria; 8. Lack of

Apprenticeship Programme and so on. He recommended that Continuing Education Programme of faculty members must get high priority.

- Halder (2009) highlighted in his paper that the present scenarios of LIS profession and the changing environment. The new roles of LIS professionals were discussed such as content manager, advocate, consortia manager, facilitator, guide/teacher, intermediate, knowledge manager, researcher, shifter, web designer etc. this study revealed the prospects opportunities to cope with the challenges in library world from traditional to digital environment.
- Hashim et al. (2012) focused in their study on various problems, trends and issues in preparing digital library professionals and concluded that demonstrated skills and sophisticated expertise competencies are needed for new era librarians to manage the Digital Information System (DIS).
- Saracevic (2000) examined the structures, context, and criteria of digital libraries in his study: What should we evaluate? For what purpose do we evaluate? Who should evaluate? At what level do we evaluate? Upon what criteria do we evaluate? His paper is considered as a part of the evolution of concepts for digital library evaluation. In this paper he enumerated the challenges facing digital library assessment and proposed a theoretical evaluation framework based on the systems approach.
- Mac-Ikemenjima (2005) analysed the Challenges to e-Education in Nigeria. These challenges included: 1. Inadequate ICT infrastructure (computer hardware and software high, and bandwidth/access etc); 2. Lack of skilled manpower; 3. Inadequate training facilities for ICT education; 4. Resistance to change from traditional pedagogical methods to more innovative, technology-based teaching and learning methods; 5. Lack of funding; 6. Lack of collaboration; 7. Ineffective coordination of all the various ICT for education initiatives
- Byrne (2003) discussed in his paper the major barriers and challenges regarding scholarly information in digital libraries. He stressed on need of education and skills for the emerging digital librarian for giving effective library services.
- Khan & Bhatt (2016)-1 discussed on various issues and challenges in developing of a digital library that same are applicable in education and training of digital libraries, such as: Lack availability of adequate IT infrastructure, Lack of funds and financial support, lack of training opportunities to learn about DL, lack of interest of LIS professionals in participating in training programmes, lack

of interest LIS professionals to acquiring digital skills; inadequate support from their organization to attend training programs and acquire digital skills. inadequate knowledge about digital library security features i.e., security software, use encryption and decryption techniques, understanding of data security, password protection, back-end control systems for a digital library (Khan & Bhatt (2016).

- Mohsenzadeh (2010) also suggested to conduct a future research that larger scale on digital libraries framework for other LIS schools in different countries to find out problems of digital librarians. The aim of the study was to identify issues and challenges of LIS professionals in developing digital libraries.
- Dalhstrom and Doracic (2009) described in their article the aims and nature of the particular cultural heritage (CH) digitization education at Swedish School of Library and Information Science (SSLIS), accompanied with a brief overview of Nordic CH digitization education efforts. Ten particular challenges when launching and managing the course are highlighted: (1) Dealing with selection and preservation issues, (2) Making students aware of critical textual scholarship, (3) targeting and collaboration, (4) Deciding whether to offer the course on-site or online, (5) Managing conflicting interests and needs, (6) Avoiding the easy way out, (7) Balancing between text and image digitization strategies, (8) Balancing between artificiality and realism, (9) Supporting the idea of reusability, (10) Documenting, evaluating and sharing. By identifying such challenges and discussing possible ways to tackle them, the authors hope to encourage discussions that can serve future education planning.
- Baro and Eberechukwu Eze (2013) investigated the achievements of librarians from the workshop on e-library services organized by the Librarians' Registration Council of Nigeria (LRCN) in collaboration with The United States Mission, Nigeria. The study found that librarians who participated in the workshop have been exposed to skills in areas such as database searching, using different search engines, using social media, knowledge of relevant websites, and knowledge of planning for e-libraries. The participants are of the opinion that a workshop of this kind should be organized at least twice a year to upgrade librarians' skills on e-library services in Nigeria. Researchers enumerated the require a wide range of new or enhanced skills of modern librarians, these are: professional skills; technical and IT skills; flexibility; ability to work under

pressure.; ability to learn quickly; communication skills; negotiating skills; people skills; presentation skills; teaching skills; customer services skills; analytical and evaluative skills; project management skills; and vision.

- Saracevic and Dalbello (2001) suggested the content choices for digital library education according to fall into categories that are based on: “systems, networks, and technology; collection and resources in various media; representation, organization, and operability; storage and searching; functionality, access and use; institutions and services; and user communities and related applications”
- According to Satpathy and Maharana (2011) that due to shortages of time and insufficient training opportunities, librarians face difficulties in acquiring digital skills. The key limitations faced by library professionals in learning ICT skills are the library's tight work schedule, poor infrastructure services and lack of ICT skills and lack of cooperation from authorities. But there is still ample scope to develop their ICT skills and to incorporate these skills in libraries to provide users with new ICT-based library services. Some recommendations have been made for enhancing ICT skills of LIS professionals that In order to upgrade the ICT abilities of LIS professionals, the library authorities need to provide the requisite scope and encouragement. Engineering institutions need to improve their libraries' infrastructural facilities in order to allow the best use of the ICT skills of LIS professionals. The library schools of Orissa need to change their curricula concentrating more on ICT and evolving library climate. The LIS professional associations and institutions need to organize different training programmes for LIS professionals to develop their ICT skills.

2.2.5 Opportunities for Digital Library Education and Training

Table 2.8 shows various key aspects of the reviewed relevant studies on the broad theme of “*opportunities for digital library education and training*”:

Table – 2.8: Key Aspects of the Studies: Opportunities for Digital Library Education and Training

Author(s)	Key aspects of the study
<ul style="list-style-type: none"> • Mahesh et al. (2010); Pujar & Bansode 	<ul style="list-style-type: none"> • Importance of short-term LIS training courses in India

<p>(2014); Do et. al. (2019); Arif and Mahmood (2010); Chand & Dheer (2009); Yuan et al. (2008) and so on</p>	<ul style="list-style-type: none"> • <i>Role of MOOCs in improving the LIS education and skills of library professionals</i> • <i>Contextual factors affecting the development of digital library education</i> • <i>Pattern and extent of the adoption of Web 2.0 technologies by librarians in the digital world</i> • <i>Role of selected organizations India, those are promoting and enhancing LIS professionals in India through various training programmes</i>
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- Mahesh et al. (2010) emphasized in their study, the need of short-term Library and information science training courses in India. Short-term programmes have filled the gap that existed in the LIS curriculum. Short-term training programmes in LIS were concentrated in India at national level institutions such as INSDOC (now NISCAIR/NIScPR), which had the mission and capability to offer courses. They stated in this article that short-term courses are an important component of the education system because they meet the society's continuous education demands, and short-term training courses allow practicing LIS professionals to learn their job-related skills to others. These courses give library practitioners a place to share their knowledge and develop improved learning possibilities.
- Pujar & Bansode (2014) concluded in their research that Massive Open Online Courses (MOOCs) will provide librarians with a chance to improve their LIS knowledge and abilities. In today's Internet age, librarians are expected to have a wide range of skills, including ICT. It is quite difficult for any library school to provide comprehensive education and training in all aspects of modern librarianship, particularly in developing nations like India. These nations' library schools confront a number of problems, including a lack of teachers, finances, skills, resources, and facilities. MOOCs may play an important role in improving the quality of LIS education and training in the domains mentioned above, as well as providing opportunities.
- Do et. al. (2019) discovered the contextual factors affecting the development of digital library education (DLE) in Vietnam and to determined how those factors are enabling or hindering its development. Some considerations are enablers, some are obstacles, and some are both. Those involved in the development of

Digital Library Education (DLE) in nations such as Vietnam, especially agents of change, should use the model to help them understand what kinds of opportunities and challenges they will face with every attempt to promote DLE. The authors argue that in Vietnam, digital library education has evolved too slowly and, as a consequence, libraries are unable to hire enough library professionals with the requisite skills to work in a digital library. As a Southeast Asian country with an increasing demand for library graduates with the requisite skills to work in and manage digital libraries, Vietnam is not alone. The model built in this study may therefore play an important role in understanding the factors influencing the production of DLE in other South East Asian countries.

- Arif and Mahmood (2010) investigated the range and pattern of the acceptance of Web 2.0 technologies by Pakistani librarians to know the changing role of librarians in the digital world. Working with digital information and computers in a networked environment is a key driver of library and information professionals' evolving roles and allows them to learn new skills and knowledge. Authors have proposed that professional library societies, library schools and employers should organize workshops to train modern digital librarians. Training programmes should be arranged for the technological aspects and application of Web 2.0 technologies. In this regard, the role of library schools (for pre-service education) and library associations (for in-service training) is vital. It is proposed that Library and information science professionals should be provided with international training opportunities by the Higher Education Commission.
- Chand and Dheer (2009) found in their study, that library and information science (LIS) professionals were in desperate need of acquiring the necessary skills and knowledge to keep up with the world of information and become competent enough to give the best services to users. They also talked about some of the organisations in India that are working to promote and improve LIS professionals through various training programmes, these are: National Institute of Science Communication and Information Resources (NISCAIR) (now NIScPR), New Delhi, Defence Scientific Information & Documentation Centre (DESIDOC), New Delhi, Tata Energy and Resources Institute (TERI), New Delhi, Indian Institute of Technology (IITs), Indian Institute of Management (IIMs), National Information Centre (NIC), New Delhi, National Institute of

Health and family welfare (NIHFW), New Delhi, PSG Institute of Management, Coimbatore, Institute of Health Management and Research, Jaipur, JP Institute of Information Technology (JIIT), Noida, Delhi College of Engineering, New Delhi, Centre for Science and Environment, New Delhi, Tata Institute of Social Science (TISS), Mumbai, Central Drug Research Institute (CDRI), Lucknow.

- Yuan et al. (2008) focused in on Open Educational Resources (OER), that we can take OERs as educational or enhanced training opportunity for professional development. They stated that open educational resources (OER) give new options for teaching and learning while also challenging traditional teaching and learning approaches in university level education.

2.2.6 Competencies Development of Digital Library Professionals

Table 2.9 shows various key aspects of the reviewed relevant studies on the broad theme of “*competencies development of digital library professionals*”:

Table – 2.9: Key Aspects of the Studies: Competencies Development of Digital Library Professionals

Author(s)	Key aspects of the study
<p><i>Raju (2014); Choi and Rasmussen (2006); Choi and Ramussen (2009); Coleman (2002); Tzoc and Millard (2011); Allard (2005); Marion (2001); Howard (2010); Singh (2014); Chowdhary & Chowdhary (2003); Sheenivasulu (2000); Shinde (2009); Sood et al. (2006); Khan & Bhatti (2012); Gopalkrishan & Kumar (2013); Rahman (2012); Mahapatra (2006); Khan & Bhatti</i></p>	<ul style="list-style-type: none"> • <i>Key knowledge and skill sets required for LIS professionals in digital library environment.</i> • <i>digital librarians’ roles, and have suggested core competencies and skills needed to perform these roles.</i> • <i>Personal attributes as being important in the LIS work environment.</i> • <i>Core elements outlined by IFLA in the context of digital libraries.</i> • <i>Current technical skills being sought for digital librarian</i> • <i>The librarian’s role in institutional repositories (IRs)</i> • <i>Skills and current requirements of digital librarians for technologically oriented jobs</i> • <i>Digital librarians’ roles, and have suggested core competencies and needed skills.</i>

<p>(2016); Mohsenzadeh and Isfandyari-Moghaddam (2011); Varalakshmi (2009); Baro et al. (2019), and so on.</p>	<ul style="list-style-type: none"> • <i>Various facets related to Digital Competencies in the context of library professionals and the services both digital and online</i> • <i>Digital competencies for developing and managing digital libraries</i> • <i>Existing digital library course content of LIS departments in India</i>
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There are some researches had been conducted to identifying areas of core competencies on digital libraries. Pomerantz et al. (2006) classified core reading topics of digital libraries into ten different modules. Module number 1 is overview of digital libraries, which is basics of digital libraries. Second module is “Collection development” which again classified into to sub-modules: (a) Digitization and (b) Documents and E-publishing Markup. Third module is “Digital Objects”, which classified into three sub-modules: (a) Text resources (b) Multimedia (c) File Formats Transformation. Module no. 4 is “Information/ Knowledge Organisation”, this module has classified into four sub-modules: (a) Metadata Harvesting, Cataloguing, (b) Ontologies, Classification, Categorisation, (c) Vocabulary Control, (d) Bibliographies, Bibliometrics, Webographics. Fifth module is “Architecture – Agents, Mediators”, which is classified into ten sub-modules: (a) Interoperability, (b) Sustainability, (c) Interface design, Usability assessment, (d) Search engine & IR, (e) Identifiers, Handles, DOI, PURL, (f) Info Summarization, Visualization, (g) Recommender system (h) Applications – Greenstone, Fedora, DSpace, (i) Web-publishing – Wikki, RSS, Moodle, etc., (j) Security. Module number 6 is “Speces (Conceptual, geographic, 2/3 D, VR)”, which is classified into to sub-modules: (a) Storage, and (b) Repositories, archives. Module number 7 is “Digital Library Services (Searching, Linking, Browsing, Annotating, etc.), this module is classified again into five sub-modules: (a) Info needs, Relevance, Evaluation (b) Search strategy, Information seeking behaviour, (c) Reference services, (d) Routine community filtering, (e) Sharing interchange network. Module number 8 is based on “Archiving preservation integrity”. Module number 9 is based on “Project Management”, this module classified into seven sub-modules: (a) Digital library development for a specific domain, (b) Digital library project examples, (c) Digital library evaluation, (d) Legal issues (e.g., Copyright), (e) Cost/economic issues, (f) Social issues, (g) Future of digital libraries and last module

number 10 is based on “digital library education and research”. Some important areas of core competencies on digital libraries are given in Table 2.10:

Table – 2.10: Areas of Core Competencies on Digital Libraries: International Perspective

<i>Audunson & Shuva (2016)</i>	<i>Choi & Rasmussen (2006)</i>	<i>Pomerantz et al. (2006)</i>
<ul style="list-style-type: none"> • Digital Library Standards • Role of digital libraries in Society • Information Architecture • Design and Evaluation of digital libraries • Copyright and Intellectual Property Right • Digital Library Usability and Interface • Digital Library Building and Management of digital libraries • Development and Management of Digital Libraries • Metadata • Digitization and Preservation • Digital Library Software • Access and Usage of Digital Libraries • Definition, History and Development of Digital Libraries • Digital library architecture and design 	<ul style="list-style-type: none"> • Digital projects/initiatives, • Technical standards/practices • Design, development and implementation • Digital preservation • Digital framework • Digital repository • Digital contents aspects • Websites, digitizing/convertng • Technical support • System administration/maintenance • Data conversion, system analysis/testing • Open-source software development • Usability testing • Interoperability • Digital library technology • Metadata • Access and retrieval mechanisms • Collection development • Collection management 	<ul style="list-style-type: none"> • Overview of digital libraries • Collection development • Digital Objects • Information/ Knowledge Organisation • Architecture – Agents, Mediators • Spaces (Conceptual, geographic, 2/3 D, VR)” • Digital Library Services (Searching, Linking, Browsing, Annotating, etc.), • Archiving preservation integrity • Project Management - specific domain and DL projects examples • digital library education and research

➤ Raju (2014) discussed in his article on his article, Raju (2014) discussed the development of a complete skills statement that would serve as an objective framework against which LIS practitioners in the modern digital library

environment in South Africa may assess their current abilities. They also recognize the need for more skill development. They compiled a preliminary list of important knowledge and skillsets required of LIS professionals working in a digital library environment. In the digital library environment, they specified three categories of knowledge and skills requirements: Disciplinary knowledge comes first, followed by generic skills and personal competencies.

- Choi and Rasmussen (2006) outlined the responsibilities of digital librarians and recommended essential abilities and skills required to execute these jobs. And identified digital librarian's activities, skills and competencies and to detect any gaps in their training. They confirmed from their study that as the nature of the digital libraries is constantly changing, digital librarians' must be able to adapt to change and continue to learn. As a result, teaching digital librarians capable of working in a dynamic and complicated digital world has become a top concern. Regrettably, there are now limited chances for librarians to obtain training in the additional activities and responsibilities that digital libraries necessitate. They suggested that their study was confined to digital librarians working in non-public service sectors. A similar study on individual components of a digital library framework would be desirable to understand the similarities and differences in terms of required skills and knowledge, core competencies required for digital librarians, and learning from existing digital library practise to better future information professionals. They highlighted three types of skills and knowledge needed for digital library professionals, which are: (1) Technical competencies: Understanding of DL library architecture and software, Technical and quality standards, Markup language (2) Library related competencies: Needs of users, Digital archiving and preservation, Cataloguing, classification and metadata (3) Other competencies: Interpersonal and communication, project management and leadership and Legal issues. Researchers identified following training gaps in digital library education: Technical Aspects, Overall understanding of digitization and digital libraries, Project management skills, Management, administration, supervisory skills, Collection development, Metadata, Organizational structures, library culture, changing policies, day-to-day work, Contract law, licensing.
- Choi and Ramussen (2009) recognized the following personal qualities as being crucial in the LIS work environment based on the literature: the ability to learn

continuously, flexibility, the ability to encourage change, and the ability to work autonomously.

- Coleman (2002) compared in his study ten core elements mentioned by the International Federation of Library Associations and Institutions (IFLA) with fourteen areas of knowledge set out by the computer curricula report jointly prepared by the Association for the Machinery and Institute of Electrical and Electronics Engineering (IEEE) in the context of digital libraries.
- Tzoc and Millard (2011) investigated the current technical abilities required of digital librarians. They analysed that digital librarian need to seek out additional non-curricular opportunities to build competency in the technical areas, if they expect to be marketable. Continuously learning and improving technical skills will be essential for professional development of new digital librarian. He also suggested that a further study of the overlap of responsibilities and expectations for digital librarians in other areas of academic libraries will be useful.
- Allard (2005) identified in his paper the librarian's role in institutional repositories (IRs). He mentioned six roles for the same that were: understanding software; project planning and management; collection definition; metadata guidance; submission review and author training.
- Marion (2001) attempted in his paper to explore skills and current requirements of digital librarians for technologically oriented jobs. His study provided a coherent picture of the job skills, both technical and behavioural, that currently desirable by prospective employers. He mentioned three types of skills of for digital librarian: 1. Technical skills; 2. Long-established technologies and behaviours to emerging trends; 3. Technical service competencies to public service competencies. The study claims for the continuing observing of professional abilities performing in job ads as a beneficial outlook on present trends in librarianship.
- Howard (2010) has determined in his paper the skills and knowledge required of library and information professionals to work in a digital library environment, a determination on the elements which should be included in the curricula of a digital library education programme were discussed.
- Singh (2014) discussed in his paper about skills and competencies required in the changing scenario of libraries. He identified major three types of skills

required for digital librarians: General skills, Information technology skills, Interpersonal & communication skills and management skills.

- Chowdhary & Chowdhary (2003) described digital librarians' roles, and have suggested core competencies and skills needed to perform these roles. These are including: creating search strategies; guiding and training users; creating metadata; digitizing, designing interface and portals; project management etc.
- Shinde (2009) mentioned in his paper generally two types of competencies for Library professionals: first is Personal competencies and second is Professional competencies and he described the minimum required competencies and skills for library professionals, such as: Corporate mindset, Computer & Communication skill, Information retrieval competency, Networking Competency, Production of future IT environment, Communication skill, Logical skill and analytical skills, Human Resource management skill, Equipment acquisition skill etc. he concluded that there was a lack of literature in Library and information science on 'future studies' and it was very needed to restructure LIS curricula.
- Sood et al. (2006) found that the emerging digital library has reshaped the core skills needed by library professionals. The librarians will have to cope-up with the challenges in learning new skills because digital libraries require both the skills of librarians as well as those of computer scientists. Librarians must serve the diverse needs of a diverse world. The librarians will have to be more dynamic, professional and functional in modern digital world.
- Khan and Bhatti (2012) found in their study that owing to the shifting information landscape, the librarians working in developing countries are facing common problems such as inadequate technical skills, advance searching skills, inadequate trained and skilled manpower, use of digital source of information, different library software's, inadequate trainings, low rate of information literacy and professional status. They recommended LIS curricula must be revised in developing countries; it should be revised after every two years according to the new trends in the profession.
- Gopalkrishan & Kumar (2013) discussed in their paper the various facets related to Digital Competencies in the context of library professionals and the services both digital and online. They concluded that the library professionals need to be digitally competent with their ability to understand media to search for

information and be critical about what is retrieved and to be able to communicate with others using a variety of digital tools and applications.

- Rahman (2012) focused in his paper on the basic concepts of 'Digital Library' and highlighted the purposes and various features of digital librarians. This paper explored the core competencies and skills of Digital Librarian in to take care of the twenty-first century's digital library and manage the digital information system.
- Sreenivasulu (2000) in his paper Stressed on requires skills and competencies of next generations digital librarian's that to be essentially that a capable digital librarian who has to manage and organize the digital library, handle the specialized tasks of massive digitization, storage, access, digital knowledge mining, digital reference services, electronic information services, search co-ordination, and manage the archive and its access.
- Mahapatra (2006) identified the suitable skills for emerging digital librarians, the necessary skills should be essential such is leadership, information processing, communication, crisis management, team building, and decision making, to name a few. As a result, library professionals are in desperate need of acquiring the necessary skills and knowledge in order to keep up with the world of information and become competent enough to serve in a digital society. Her study proposed the core elements of the LIS curriculum and the vision of LIS education in India for coming decade. Her paper also stresses the needs of revised course contents and allied challenges for readiness of Indian LIS education in digital era.
- Khan & Bhatti (2016) categorized digital competencies for developing and managing digital libraries into three main categories: (1) digital competencies for developing digital libraries (knowledge of digitization, assigning metadata, ability to develop a database of digital contents, knowledge of digital storage devices and preservation of digital content); (2) managing digital libraries (digital library infrastructure, define policies and standards for digitization, cost planning, manage staff, train library users and knowledge of digital library evaluation and digital skills to backup digital contents) ; and (3) digital competencies to protect digital contents (knowledge to apply security software firewalls, filtering routers, encryption and decryption measures on data, knowledge of data security by keeping a backup of digital contents in case of a

disaster, knowledge to protect access to the digital content by providing passwords, knowledge of security measures and knowledge to design administrative back-end control systems). Digital competencies for developing a digital library.

- Mohsenzadeh and Isfandyari-Moghaddam (2011) reported that skills and competencies of traditional librarian have been changed due to the emergence of the digital environment of libraries and it is very needed for modern librarian to learn new tools and technologies about digital libraries to survive their existence and to play effective role as real information professionals in the 21st century.
- Varalakshmi (2009) found that the existing digital library course content of LIS departments in India is not satisfactory, because the majority of departments offer it as one unit/bloc of the core course. Some schools modified their curricula because of mounting pressure from markets and employers. But, due to lack of facilities they do not follow their mentioned syllabi. These problems make graduates suffer to get placement due to lack of competencies. The major challenge for LIS education now is to cope up with the technology.
- Safahieh and Asemi (2010) conducted a study which revealed A majority of librarians have acquired their programming skills through informal networks at Isfahan University (Iran). This requires that library schools have sufficient education in digital literacy to prepare their students in this digital age. The results revealed that most respondents do not yet have a good level of computer skills and their computer literacy skills have not generally been enhanced even by their long-term experience of computer usage. Computers have made it possible for librarians to operate easier and quicker, based on the study results, but some issues impede their productive use of the computer. These issues include recurrent machine failure, electric power failure, insufficient library computers, and inadequate computer skills of librarians.
- Baro et al. (2019) pointed out different kinds of digital skills needed to work in the modern digital library environment. Adequate digital skills for the creation, implementation, and development of digital libraries and the use of appropriate digital library software, as well as optical character recognition, metadata assignment, information acquisition using digitization scanners, and the production of high-resolution, good-quality digital It is important to have the material. It is also necessary for digital library infrastructures and equipment to

be able to be controlled once the digital content has been created. In this digital age, digital library education and training in library schools in developing countries is critical for equipping LIS professionals with the skills and abilities needed to create and management of digital libraries.

2.7 Online Education in Library and Information Science

Online education is synonyms of e-learning. Basically e-learning tools and techniques are based on virtual education, computer-based learning, and web-based learning. Many studies have reported on different issues of e-learning in Library and information science discipline.

Kumbhar (2009) mentioned in his paper that “E-learning as more suitable for short-term, specialized courses in Library and information science. Different E-learning tools such as Course Management Systems (CMS), Blogs, Wikis, Email, Messenger are very useful for providing education. Some worldwide initiatives in Library and information science being undertaken in recent years by ACRL (Association of College and Research Libraries), Click University, YALSA (Young Adult Library Services Association), AASL (American Association of School Libraries), RUSA (Reference and User Services Association), PLA (Public Library Association), IMARK (Information Management Resources Kit), SLA (Special Libraries Association), NELINET etc.

Lihitkar et.al. (2013) highlighted worldwide initiatives of e-learning programmes in Library and information science. The aim of their study was to determine impact of e-learning and courses on LIS run by the Universities in the world. They mentioned three types of e-learning method, which could be adopted in LIS education: Virtual class room; Mobile learning and Blended learning. Major worldwide initiatives for e-learning in LIS mentioned include ACRL; SLA; YALSA; RUSA; PLA; IMARK; University of North Texas; NELINET; University of Washington; Uni. of Pittsburgh; Mansfield University; University of Arizona; The University of Illinois; University of Wisconsin; Florida State University.; Curtin University.; Drexel University.; etc.

Forbs (2014) discussed in his paper some free web-based tools for education as instruction. These names include Infogr.am; Popcorn maker; PowToon; Screencast-o-matic; Screenr; SoundCloud; Tildee; ThingLink; Zaption and other web 2.0 sources.

It explored only a small sample of the many free tools, which are available for interesting and creating learning.

Kathryn Nichols Hess (2014) examined online learning objects; offered for learning in academic libraries. He mentioned that continuing the training process helps to ensure that all LIS professionals can continue to create meaningful learning objects within the system developed.

E. Klobas (2014) measured of online open course success for noncommercial institutional providers of massive open online courses (MOOCs) and other open online courses. He mentioned two characteristics of open online courses; one that open online course has open enrolment and there is no restriction for access to all. And second is that most of the courses are available in without charge.

Tripathi and Jeevan (2010) highlighted in their study the various steps required to be undertaken by an institution to venture into e-learning, especially in the context of a professional discipline like LIS. They have also discussed on various issues related to e-learning, different perspectives of teacher, learner, and institution. They emphasized that a rigorous research needs to be undertaken to find out if online programme is needed in LIS.”

During COVID-19 University Grants Commission (UGC) has provided guidelines to the teachers, students and researchers in Universities and Colleges for utilisation lockdown time productively by engaging in On-line learning. There are several ICT initiatives of the MHRD, UGC and its Inter University Centres (IUCs) Information and Library Network (INFLIBNET) and Consortium for Educational Communication (CBC), in the form of digital platforms which aim be accessed by the teachers, students and researchers in Universities and Colleges for broadening their horizon of learning. UGC suggested ICT initiatives for online learning, such as: SWAYAM On-line courses; UG/PG MOOCs; e-PGpathshala; e-content courseware in UG subjects; Swayam Prabha; CEC-UGC YouTube Channel; National Digital Library; Shodhganga; e-Shodh Sindhu, and Vidwan database (UGC Notice, 2020).

2.8 MOOCs as Online Source for E-learning

Massive open online courses (MOOCs) are open-access courses that are available online. It provides an open online learning platform for study over the web freely or

with a nominal fee to a very large number of people. MOOCs developed by experts of the subject specific field of universities.

- **SWAYAM: Indian MOOC Portal**

An initiative has taken by Govt. of India for providing effective higher education through Online Learning for all subjects, free of cost for anyone. All open online courses will be available on **SWAYAM (MOOCs)** portal. SWAYAM stands for “Study Webs of Active-learning for Young Aspiring Minds”. The Govt. of India notified UGC (Credit Framework for Online Learning Courses through SWAYAM) Regulation, 2016 in Gazette dated 20 July 2016. As well as a list of 63 MOOCs courses has also been declared by UGC. There are six open online courses available on Library and information science under this list. Two courses are basically on digital library components. One Course is on “**Digital Libraries**”, which has been organised and affiliated by INFLIBNET. It is three months free online course. It has 5 credits. And second course title is “Library Automation and Digitization”, which is organised and affiliated by IGNOU. This course has four credits and it is also free, online three months course. Learners can access the contents of the course on digital library through the SWAYAM platform.

University Grants Commission (UGC) notified the “UGC-Credit Framework for Online Learning Courses through Study Webs of Active Learning for Young Aspiring Minds, Regulations, 2021, which has an enabling provision for an institution to allow up to 40% of the total courses being offered in a particular programme in a semester through the online learning courses offered through the SWAYAM Platform”. For this purpose, UGC has promoted again to online learning during COVID pandemic lockdown period and requested to Universities & Colleges to make maximum usage of the SWAYAM online platform for the help of the students/learners. The list of 83 undergraduate & 40 postgraduate MOOCs courses, which are ready to be offered on the SWAYAM platform in July-October Semester 2021. A separate postgraduate level course on “**Digital Libraries**” for MLIS students is available in the list of 83 PG MOOCs courses (UGC Notice, 2021).

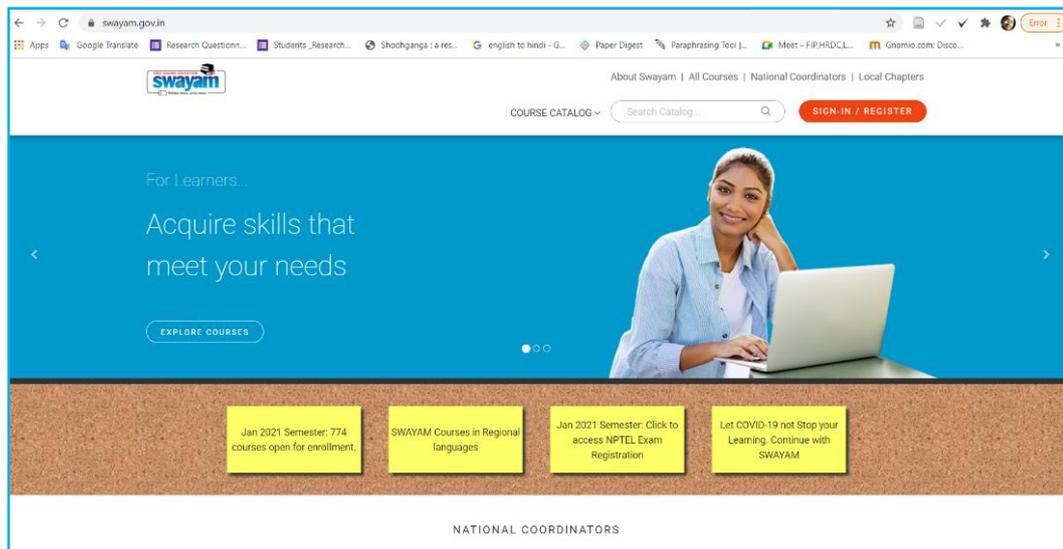


Figure 2.2: Screenshot of SWAYAM -Indian MOOCs Portal

- **Edx (<https://www.edx.org/>)**

EdX provides many massive open online courses (MOOCs). It was created in 2012 by Harvard University and MIT to provide interactive study on the web learning on-campus and across the world. Edx is a prominent MOOC provider that is both open source and non-profit. Open edX is a free online course platform built on an open-source platform. More than 1000 online courses in different subjects are available on Edx platform for everyone.

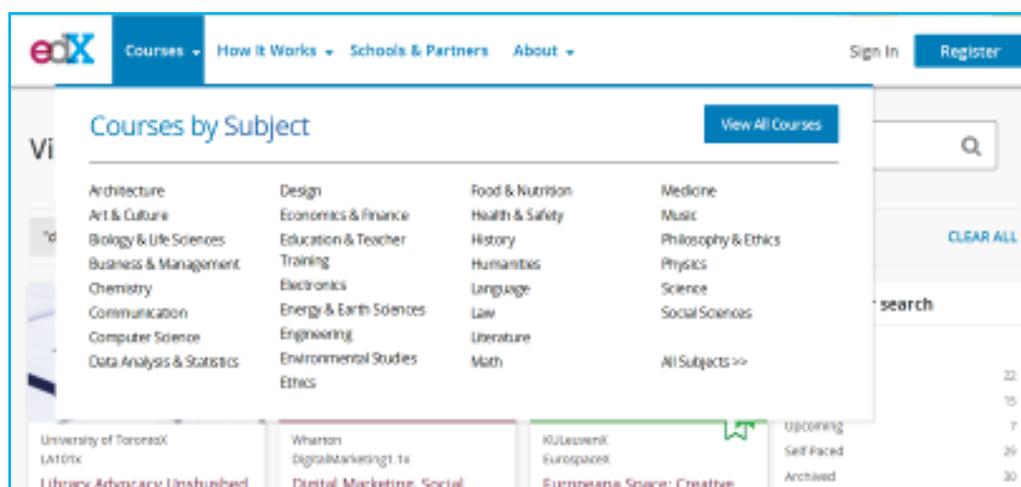


Figure 2.3: EDX – A Massive Open Online Course Provider

- **Coursera (<https://www.coursera.org/>)**

Coursera provides worldwide access of massive open online courses for everyone. It was founded in 2012. It provides a universal platform with + 140

top universities and institutions to offer online courses. More than 1500 courses are available on this platform for different subject disciplines.

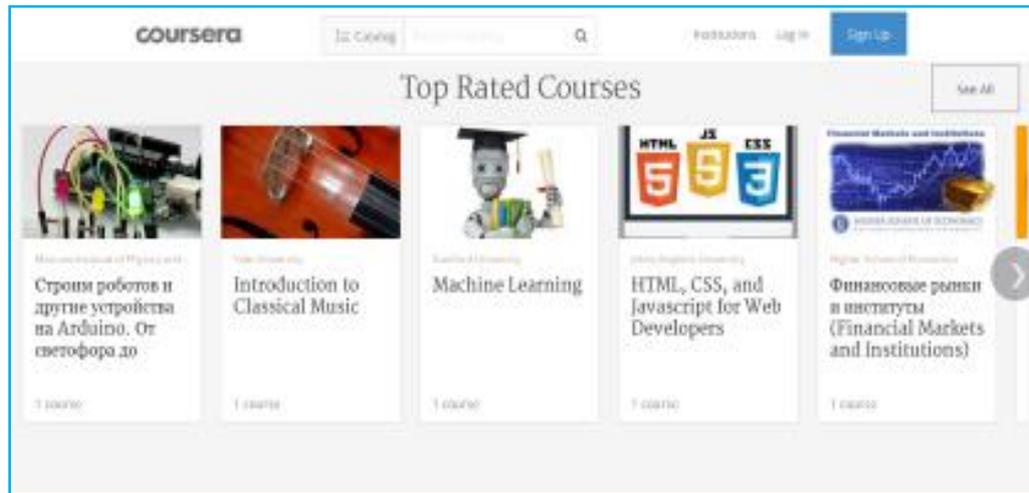


Figure 2.4: Coursera – A Massive Open Online Course Provider

- **Udacity (<https://in.udacity.com/>)**
Udacity is non-profit organization which offering massive open online courses (MOOCs). It is an open online learning platform of Stanford University. Udacity's aim is to prepare the world's workforce for future jobs. The Udacity was created with the goal of democratizing education. Many MOOC courses are available on its platform.
- **Udemy (<https://www.udemy.com/>)**
Udemy is the largest online learning platform. There are 155 K courses are available on demand of learners and about 40 million+ students are taking courses in different subject areas. Udemy having 70 K instructors, 480 M course enrolments, 115 M minutes videos, 7000+ enterprise customers. Udemy assists organizations of all sizes in preparing for the ever-changing future of work.

2.9 Research Gaps and Justification of the Present Research

The above literature review reveals various aspects related to the education and training of digital libraries in India. It would not be an exaggeration to say that the digital libraries are today's modern libraries. A few research opportunities exist regarding these technologically rich digital libraries, which may be based on various aspects of it. Researches can be conducted on various aspects or topics on digital library education and training in India as parallel to the international

perspective. From the literature review, education and training of digital libraries reveal various gaps, which help to design the right direction and aid in the construction of the proper path for this study.

In order to conduct the education and training of digital libraries effectively and successfully, there is a great need for various necessary resources along with the student and teacher. Both teachers and students have many issues and challenges, which affect them in various ways in the education and training of digital libraries. Conducting such study to verify the reality of the many hurdles to the digital library education and training in India has become essential.

Although, digital libraries are playing a vital role in fulfilling the information demands of the users in a very effective manner. Still, there is also a need to explore the role of digital librarians in digital libraries in the Indian context. There are many questions that arise like What should be the level of capability of digital libraries to meet the information? What is the librarian's role and needs in digital libraries? Whether the content related to digital library taught in Indian University is suitable for making competent digital library practitioner or not?

The number of digital libraries or digital repositories in India is very less compared to other countries, which is known from the data given on the ROAR website. This shortage of DL compels India to think that from what side is the shortage left in India after all? Is there a lack of proper education and training for a digital library in India or is there a lack of resources or some other reason for this? Thus, there is a gap between the unsatisfactory development of digital libraries and digital library education and training in the country.

Various governmental efforts have been made from time to time for the development of education for library and information science in India, such as: Ranganathan Committee on University and College Libraries (1957); Ranganathan Committee on Library Science Education (1960); Kaula Committee on Curriculum Development in LIS Education (1990); Subject Panel on Library and information science (1997); Karisiddappa Committee on Curriculum Development in LIS (2001), etc. Here it becomes necessary to find out to what level and to what extent the recommendations, suggestions, etc. of the above

development efforts have been followed in the education of library and information science in India.

The UGC had already incorporated components related to digital libraries in the library information science curriculum in 2001 as mentioned in the report of UGC model curriculum of library and information science (2001), but in the last 2 decades, there have been many changes and technologically developments in the field of digital libraries. This has become an important task to be accurately ascertained and to evaluate the digital library education currently being taught in Indian LIS schools. Has digital library education improved in India as per these changes or not? And it is also necessary that how many universities of India are providing education of digital libraries in a standard manner according to the guidelines of UGC or not? All these questions can be answered only through research in this direction to find out the exact status of digital library education in the country.

Different countries have made many efforts in digital library education and training globally, according to these efforts, Is digital library education and training in India satisfactory or not? And here it is also necessary to know which areas of digital library are being emphasized from a global perspective. For this, it is also necessary to find out the answers of questions.

In the changing scenario today, there are many ways to conduct education and training in India in an innovative manner. Online tools and technologies of education and training have attracted the attention of the entire knowledge world today. How effective these online approaches are so much in the digital library education and training? Which latest pedagogy of teaching and learning is being used in digital library education and training in the country?

From the review of relevant literature, the LIS community is still discussing whether the digital library is a totally new topic or re-structuring of a library according to technologies, despite this, it has been accepted as an established topic for Indian LIS curriculum. It also seems from literature review that there is the gap between challenges and opportunities for digital library professionals and impartment of digital library education and training by LIS Schools in India. It is

needed to examining the gap between competencies needed for digital library professionals and the provision of its education and training in Library and Information Science in India. In order to fill such gaps, a research should be carried out to be done in this direction in the Indian scenario keeping in mind the various aspects of the digital library.

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CHAPTER – 3

DIGITAL LIBRARY EDUCATION AND TRAINING: A WORLDWIDE FRAMEWORK

3.0 Introduction

Education is a valuable addition to an individual that every individual possesses in varying degrees and forms. Learning can happen at home, in the classroom, or in the community. It's described as regular or moment-to-moment experiences that are acquired, stored in the brain, and used/applied as needed. Education is treated as a worthwhile undertaking that prepares people for both the present and the future.

There has always been changes in education from ancient time to modern time, teaching and learning methods have changed a lot from time to time. Earlier, 'Guru – Shishya' tradition was much prevalent for educational attainment. In which, a student was living away from his home in Gurukul for getting education. In this method the teachers verbally shared their knowledge and involved them in real life situations. Then in the new age, textbooks, chalk, and duster have been used as teaching aids for instruction in education. Due to the ever-increasing number of aspiring students, it is being difficult to carryout face-to-face instructions to the learners with limited infrastructure and sources. But the changes taking place around education and within education are manifold and fast changing with the time.

In current trends of Library and information science, the scope and nature of digital libraries is being very comprehensive. Today, with the rapid growth of digital content and development of web technologies, there are many opportunities and options open for teaching and learning. Simply, it can be said that in the traditional system of teaching and learning has changed a lot. With the unprecedented use of information communication technology, new dimensions of developments in all disciplines have emerged and the changes have become much faster than previous years. In this way, today, many innovative experiments are being done in the field of education and

training for spreading the knowledge. So that, quality education can be offered to more and more people in less amount of and money. Consequently, during last two decades, the ICT supported learning in the form of online learning, web-based learning, remote learning, e-learning appears as a new method of education and learning. It is evident that in the current environment of web – revolution the digital library’s demand is increasing much faster.

This chapter:

1. Point outs the key developments in digital library education/courses,
2. Concentrate on the curriculum contents of digital library courses
3. Offers key digital library education initiatives at world-wide
4. Brings online courses and TLM (Teaching and Learning Material) on digital libraries
5. Highlight the important web sources that facilitate online learning in digital libraries.

3.1 History and Development of Digital Library Education: Worldwide

The beginning concept of a ‘digital library’ can be traced back to pioneering scientists such as Vannevar Bush and J.C.R. Licklider, who defined and followed the objective of new technology and approaches to information sharing as fundamental instruments for advancement in their papers. Bush (1945) devised “a device in which an individual stores all his books, records, and communications, and which is mechanized so that it may be consulted with exceeding speed and flexibility. It is an enlarged intimate supplement to his memory” The name of this device “memex” is coined by Vannevar Bush in 1945.

Spink and Cool (1999) conducted a global survey on the state of digital library education. Author found that eight of the twenty institutions examined at were outside of the United States. Digital libraries have received attention on an international level from 1999. The number of digital library courses offered in each country were as follows: United States (12), Canada (1), New Zealand (1), United Kingdom (1), Malaysia (1), Singapore (1), Australia (2), and Brazil (1). The Nanyang Technological University Singapore and the University of Malaya, both in Singapore, were two of

the Asian universities. This is an important attempt that has made to look at the topic of digital library education from a global or regional level.

National Chiaotung University in Taiwan, was the only university in the world, that offered a Master's programme in Digital Library in the Computer Science Department by 2009 (Baker, 2009). According to the result of the study, the number of academic institutions providing digital library education in Asian countries were extremely limited comparing to the rest of the world. Just eight countries, namely India, Indonesia, China, South Korea, Malaysia, Hong Kong, Taiwan, and Thailand, were offering independent digital library courses through their academic institutions. Malaysia, Singapore, Taiwan, and Japan were among the countries with academic institutions offering integrated digital library courses. Baro, E. E. (2010) performed a research to determine the level of education in digital libraries (DLs) in African library schools, as well as the readiness of African library schools to create future digital librarians. Digital library courses were identified through searching websites of LIS schools as well as asking to LIS faculty about DL courses through sending emails and questionnaire. It was found that only a few library schools offered courses specifically related to digital libraries. Clegg & O'Brien (2006) examined and reviewed the status of digital library education. They discovered four institutions with CILIP accredited courses offering DL courses, 32 institutions with ALA accredited programmes offering DL courses, 15 institutions offering DL courses in Computer Science in the United States, Canada, and the United Kingdom, and some other institutions offering DL courses from around the world. The study found that the majority of courses that consisted of a mix of theory and experience and were delivered at various levels of digital library courses. It found important to know that how many institutions are continuously offering DL courses from that institutes. A detailed list of indentified digital library courses at international level is given in Annexure – 3.1.

According to Pomerantz et al. (2006), digital library education has been gaining momentum in Malaysia since 1999. Since the early 1990s, hundreds of millions of dollars have been invested in digital library (DL) education and training. While much of this research has concentrated on how DLs can improve education, there has been little investment in promoting DL teaching and learning. In the United States and other countries where substantial DL development was taking place (e.g., Australia, China,

India, Japan, and several European nations), such research expenditure was crucial. According to Saracevic and Dalbello (2001), the American Library Accreditation (ALA) was awarding further accreditation to digital library education in the United States. While the evolving model, as seen in Michigan, the University of British Columbia, and Pittsburgh, were focussing on different aspects of preservation, there was a lack of emphasis on course material on digital libraries. Digital library courses in the United States, Canada, the United Kingdom (UK), and Australia were well-developed and generally accepted. LIS teachers and students were well aware to have access to digital equipment and information sources. Global efforts were being made in the field of digital education, but Nigeria and many other developing countries in Africa and South America were getting less attention.

3.2 Education for Digital Libraries: World-Wide Initiatives

Trends of education for digital libraries is now emerging at international level. Developed countries like United States of America, Canada, Europe, Australia, U.S are involved for educating library and information professionals according to modern digital and technological environment of information. Many universities are offering independent core course on digital libraries in different countries of the world. As well as many platforms are also available for usable course content on digital libraries. (Annexure – 3.1). Details of major digital library courses/ content at world-wide level are as follows:

3.2.1 University of Illinois, U.S.

Under School of Information Science, **University of Illinois** offers digital library course “**Digital Libraries Concentration**”. This course is certificate level and it can be completed online and on-campus mode. This programme has 32 credit hours. Topics covers under this programme are: Systems Analysis and Management; Digital Libraries; Information Modelling and; Metadata in Theory and Practice.

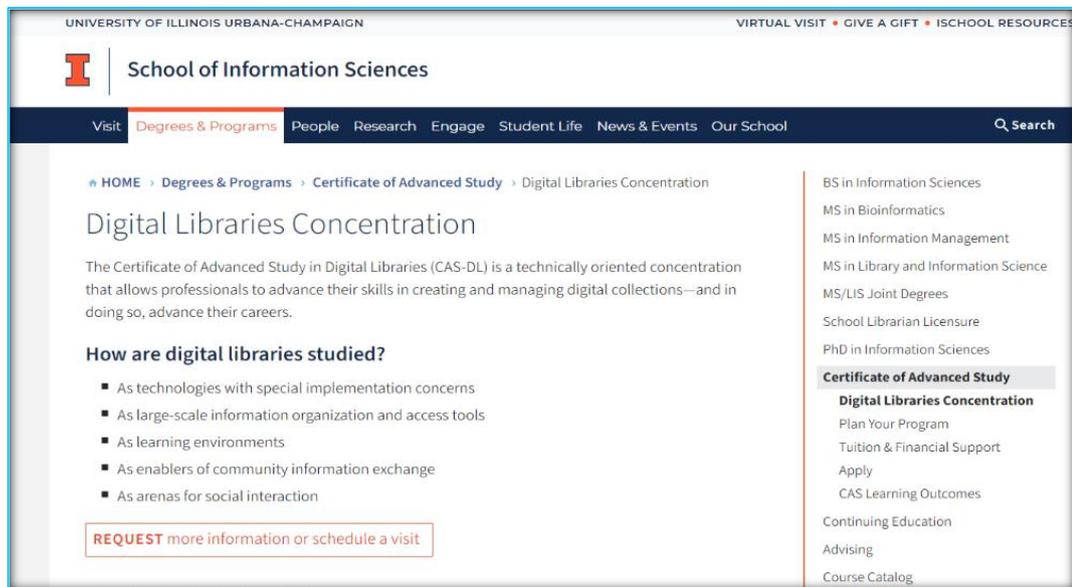


Figure 3.1: DL Course at University of Illinois, U.S.

3.2.2 The Catholic University of America

Department of Library and information science of this university offers course “Digital Libraries”. This is on campus and post graduate level course. All courses are three (3) credits. Total minimum required credits for graduation are 36 credits (12 courses). If any student has another master’s degree, his/her total LIS courses for graduation will be 30 credits.

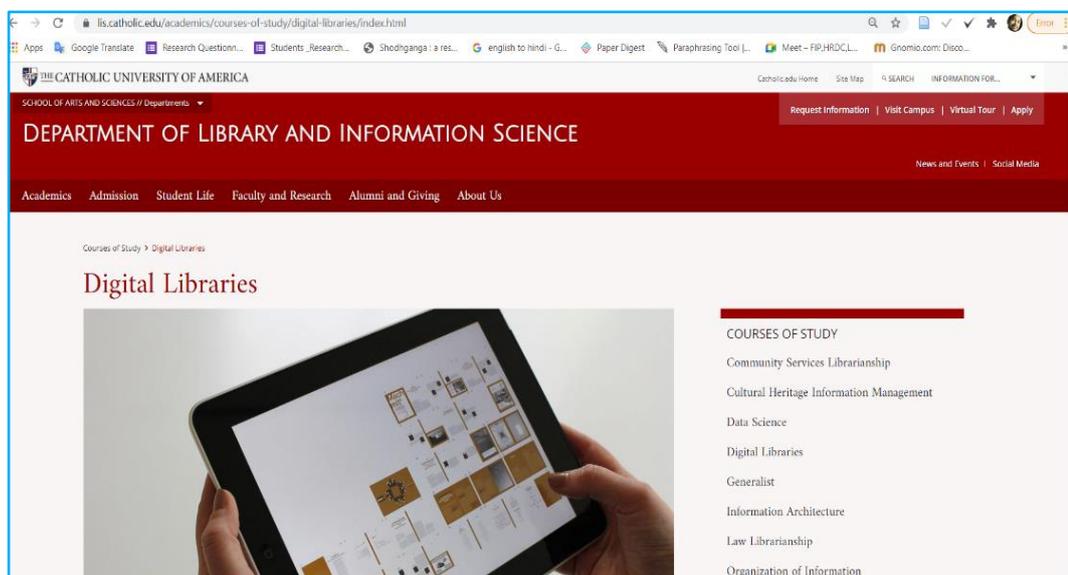


Figure 3.2: DL Course at The Catholic University of America

3.2.3 University of Wisconsin-Milwaukee

School of Information Studies at University of Wisconsin-Milwaukee provides “Certificate of Advanced Studies Digital Libraries – CAS”. This is on-campus offline campus and partially online also. Total 15 credits of course. A minimum of 12 credits must be taken in the School of Information Studies. Up to 3 credits may be taken in another school or department of the University of Wisconsin-Milwaukee. This course covers Digital Libraries; Metadata; Digital Information Services; E-Publishing & Web Design; Video Storage, Retrieval, and Preservation; Thesaurus Construction; Information Architecture; Online Information Retrieval; XML for Libraries; Information Storage and Retrieval; Multimedia; Electronic Networking and Information Services; Legal Issues for Library and Information Services; Fieldwork in Library and information science and Independent Research on digital library related topic.

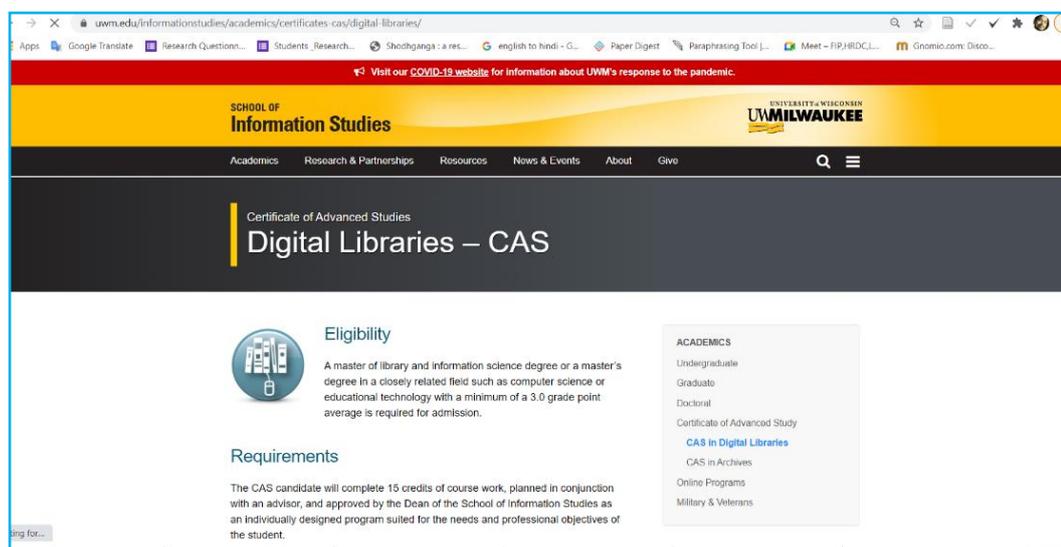


Figure 3.3: DL Course at University of Wisconsin-Milwaukee

3.2.4 Florida State University

School of Information under College of Communication of Florida State University offers “Digital Libraries Course”. This course available online mode and it is 16 weeks course. This course covers various digital library components e.g. Course Overview; What is a digital library?; digital library project management; digital library applications; Omeka practice; digital library collection development; digital library digitization; digital library metadata; digital library interfaces; digital library users;

digital library evaluation; digital library issues; digital library future; digital library practice; digital library presentation project completion & final report of the programme.

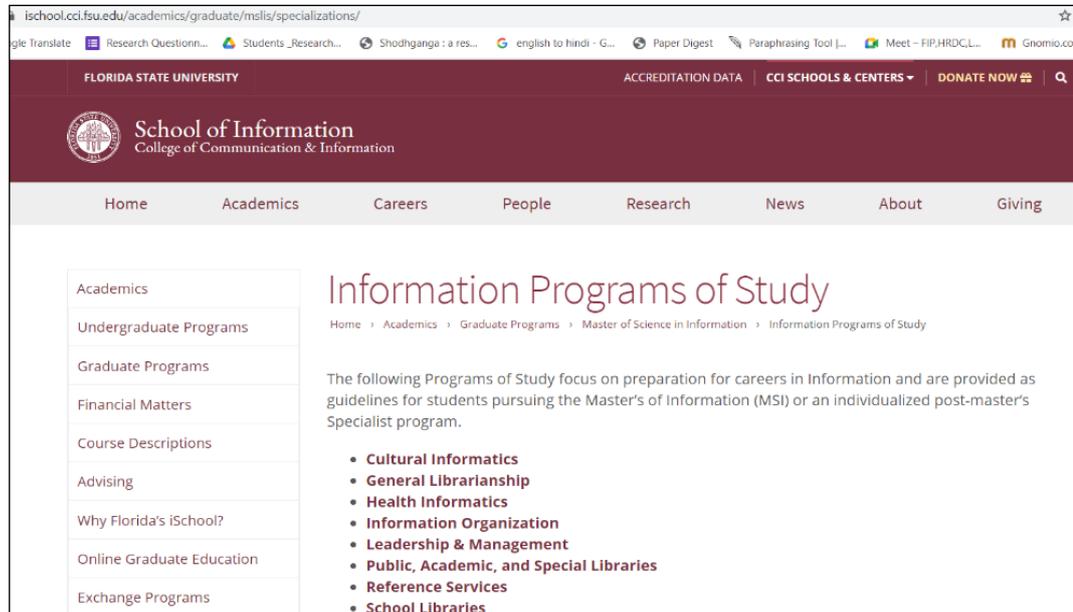


Figure 3.4: DL Course at Florida State University

3.2.5 Drexel University, Philadelphia

Drexel University, Philadelphia provides online Post-Master's Specialist Programme in Digital Libraries. This course covers accessing and organizing digital collections, designing, and creating digital library interfaces, digital library technologies etc. The course has a total 15 credits in curriculum. This is very flexible and totally online programme that is adjustable easily into learners work and their schedule. This course starts in Fall, Winter, Spring and Summer seasons of per academic calendar. This programme is accredited by American Library Association (ALA).



Figure 3.5: DL Course at Drexel University, Philadelphia

3.2.6 Mohawk College, Canada

Mohawk College provides Online Post-Diploma certificate course on the Libraries and Digital Technologies. It is professional development, accessible, part-time, online programme that provides an opportunity for library professionals to update their knowledge of technologies which are in use in libraries. It contains 12 units in this course. This course covers issues of digital resource management and technologies, metadata and their applications, digital media in libraries, digital library technologies etc. This course starts in Fall, Winter, Spring seasons of per academic calendar. This course is accredited by Ontario College Graduate Certificate.



Figure 3.6: DL Course at Mohawk College, Canada

3.2.7 RUTGERS, The State University of New Jersey

RUTGERS School of Communication and Information provides online course on MI in Digital Libraries. This is two to three years (6 semesters) course. This course contains 12 credits, which covers digital library Interface design; Organizing Information; Metadata for Information Professionals; digital library technologies; Management of libraries and Information centres etc. The online classes are taught by highly qualified instructors. This course is accredited by American Library Association (ALA).

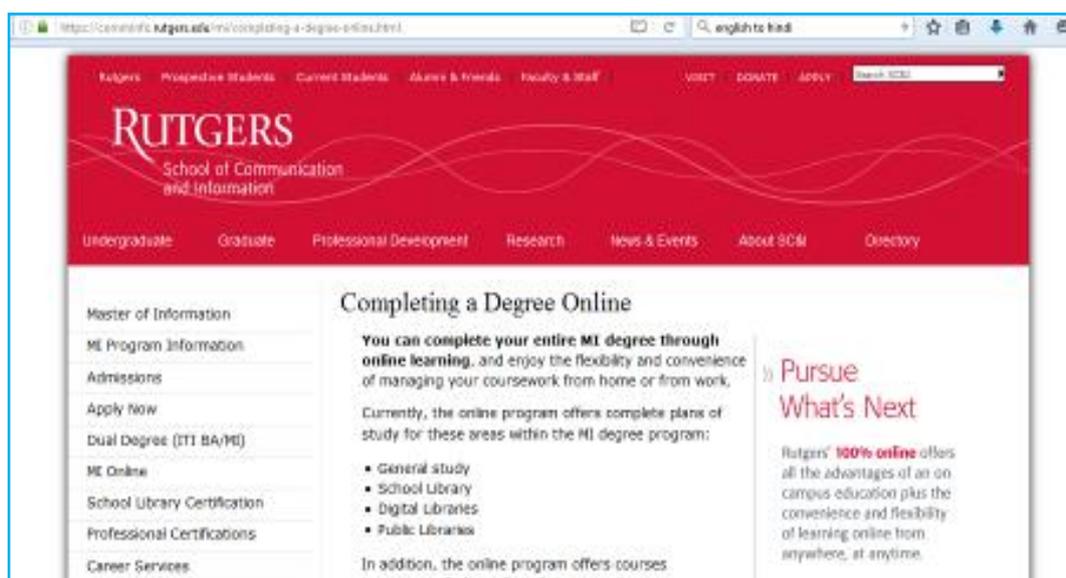


Figure 3.7: DL Course at RUTGERS, The State University of New Jersey

3.2.8 Indiana University-Purdue University at Indianapolis (IUPUI)

IUPUI offers online graduate course on digital libraries. This course covers topics on digital library: Overview of Digital Libraries; Collection Development and Preservation; Digital Objects; Organization and Representation of Information; Information Architecture; Information Access, User Behaviour, and Interaction; Management and Evaluation; Services; Issues and Digital libraries and the future etc. This is 13 Week Course. Any credit system information is not available on the website. This course is available on online mode of instruction including web-based readings and resources, threaded discussions, plus online presentations, and activities).

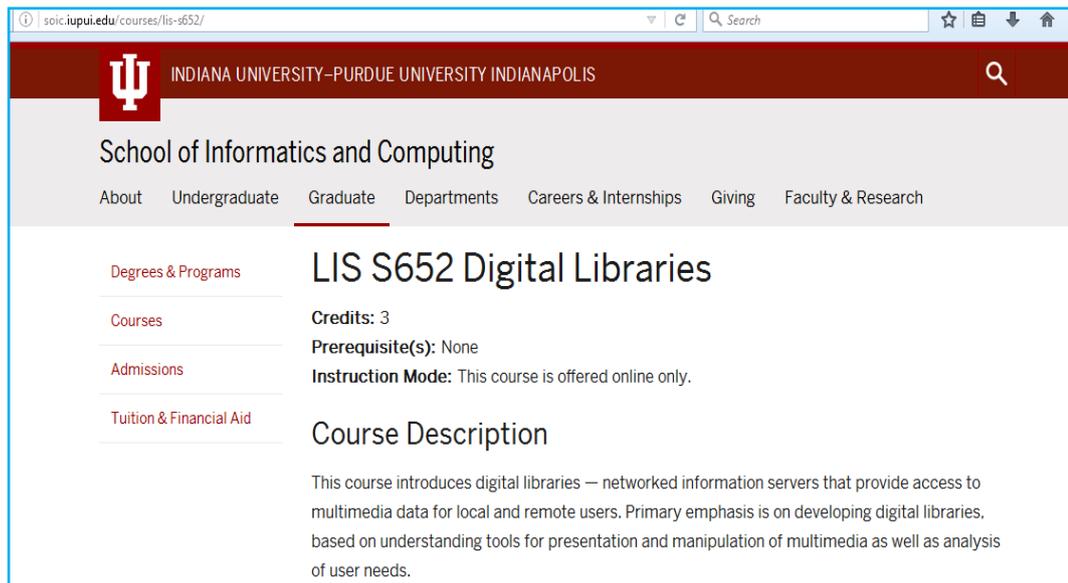


Figure 3.8: DL Course at Indiana University-Purdue University at Indianapolis (IUPUI)

3.2.9 SJSU iSchool (San Jose State University)

SJSU offers Advanced Certificate programme in Digital Assets and Services. Course content is delivered fully online. This Course focuses on digital content management, digital curation tools and services, and new digital media characteristics. Anyone can choose course from one of three specialized pathways and it can be completed in two semesters.



Figure 3.9: DL Course at SJSU iSchool (San Jose State University)

3.2.10 Oslo University College (Norway), Tallinn University (Estonia) and Parma University (Italy): (Collaborative Programme)

Oslo University College (Norway), Tallinn University (Estonia) and Parma University (Italy) is collaboratively offering a two-year Online master programme- **The International Master in Digital Library Learning (DILL)**. This course completes in four semesters. The course covers Research Methods and Theory of Science; Digital Knowledge Organization; Information and Knowledge Management; Human Resource Management; Access to Digital Libraries; Users and Usage of Digital Libraries; Quantitative and Qualitative Evaluation in its syllabus. It is a unique opportunity to study in an international group of students, with fellow students from all over the world.



Figure 3.10: DL Course at Oslo University College (Norway), Tallinn University (Estonia) and Parma University (Italy): (Collaborative Programme)

3.2.11 The University of Southern California

The University of Southern California offers online programme the Master of Management in Library and information science. It covers digital library components in its curriculum. This is innovative degree programme to help forge the next generation of librarian leaders. This online Course may be completed in 20 months and it consists of five 15-week semesters. The course is accredited by Western Association of Schools and Colleges (WASC) & ALA.



Figure 3.11: DL Course at the University of Southern California

3.2.12 The University of Arizona

The University of Arizona provides online certificate course on digital information management. It was founded in 2006. This course offers information professionals in libraries, archives, and records management departments with the theoretical understanding, conceptual frameworks, and practical skills needed to build, maintain, and curate digital information collections. The course can be completed in 6 months to three years. This course starts in the summer, fall or spring semesters each year.



Figure 3.12: DL Course at the University of Arizona

3.2.13 University of Pittsburgh

University of Pittsburgh offers online Master degree programme Library and information science. There are two digital library components: digital libraries and their community and digital humanity are being taught under this course. The duration is four years of this course. This course is accredited by the American Library Association.



Figure 3.13: DL Course at the University of Pittsburgh

3.2.14 Australian Library and Information Association (ALIA)

ALIA offers short online course on practical digitisation skills. This is a three-week course that focuses on the practical chores of generating "excellent" digital artefacts including scanned pictures, digitised audio recordings, and searchable text documents. This course can be completed within 3 weeks with nominal fee.

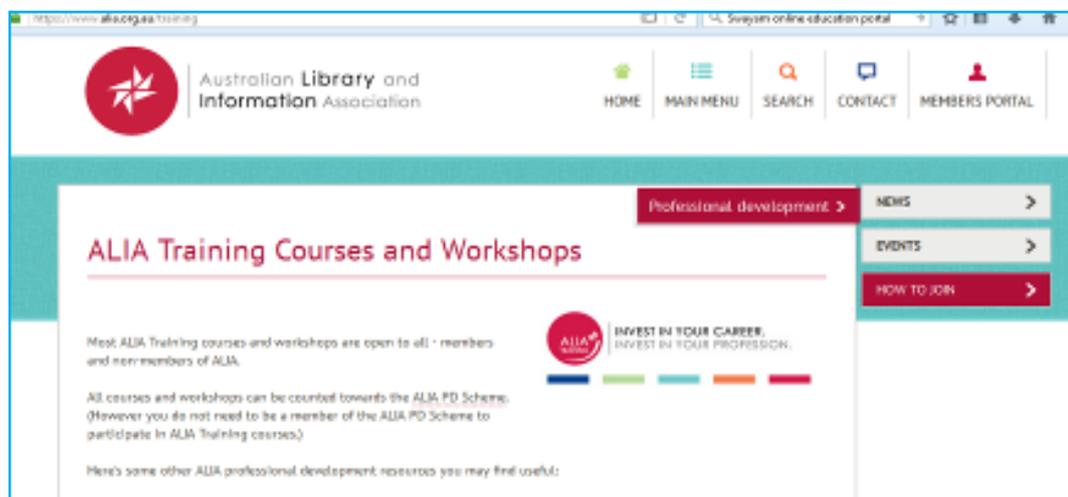


Figure 3.14: DL Course at Australian Library and Information Association (ALIA)

3.2.15 University of Naples Federico II, Italy

University of Naples Federico II, Italy offers an online course on Digital library in principle and practice. It is fully free, self-paced and online course. Any interested person can join this course. Students can learn how to discover digital libraries, create and use digital libraries, and share digital resources in the classroom by taking this course; the learning role of digital libraries, which provide a virtual space for teachers and learners to meet outside of the structure of the classroom. This course is very flexible for everyone, interested in digital libraries.

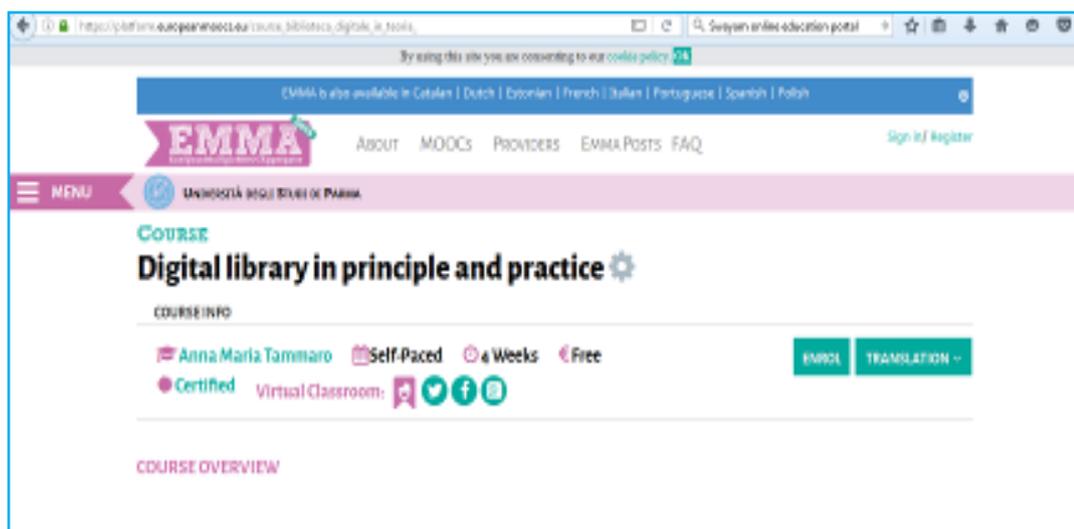


Figure 3.15: DL Course at University of Naples Federico II, Italy

3.2.16 Other Useful Platforms for Digital Library Education

- **IMARK** (http://www.imarkgroup.org/about_en.html)

The IMARK stands for Information Management Resource Kit. It is a partnership-based online learning programme to train and develop the competency of persons and support institutions world-wide. It is very useful resources and relevant to all in the information management field. IMARK is collaborative online learning initiatives of more than 50 partner institutions, which have contributed to the course design, content development, advertise, distribution, and support or language adaptations. IMARK is an open platform for free e-learning courses. Its study material is available online and downloadable.

Course Title - Digital Libraries, Repositories and Documents: This is a free online course on digital libraries, and users can also download it on CD-ROM. The course covers

basic topics relevant to the management and creation of digital repositories and digital libraries, metadata management, digital file formats, digital preservation and the database management. This course is self-placed instruction course of about 24 hours. There is total 40 lessons in its curriculum. FAO E-learning centre hosts this course.



Figure 3.16: IMARK’s Course on Digital Libraries, Repositories and Documents

- **eduscapes.com: A Site for Life-Long Learners of All Ages**

This course is intended for pre-service and professional librarians who want to learn about creating and maintaining digital libraries. It is 100% online, free and anyone can be taken it from anywhere in the world. This course delves into both the philosophy and practise of digital libraries. Topics covers definitions of digital objects (e.g., digitization processes, archiving, preservation); acquisitions and collection development; organization and representation of information (e.g., metadata, ontologies, classification, description); information architecture; information access, user behaviour and interaction; services, management, and evaluation; issues (e.g., intellectual property, privacy, social, economic, sustainability); evolving technologies; and research agendas.



Figure 3.17: eduscapes.com: A Site for Life-Long Learners of All Ages

- **LYRASIS: an academic consortium of U.S.**

LYRASIS is a non-profit membership organization, established in April 2009. LYRASIS supports to information professionals by increased savings opportunities and offering creative solutions. LYRASIS conducts Live webinars, free information sessions, and demonstrations on various subject areas. It provides digital & preservation training to information professionals with nominal fee. The topics covers under this training are digital preservation; digitization; preservation; technology services. Training content deliver by conferences and meeting; face to face; live online and it is self-placed also.

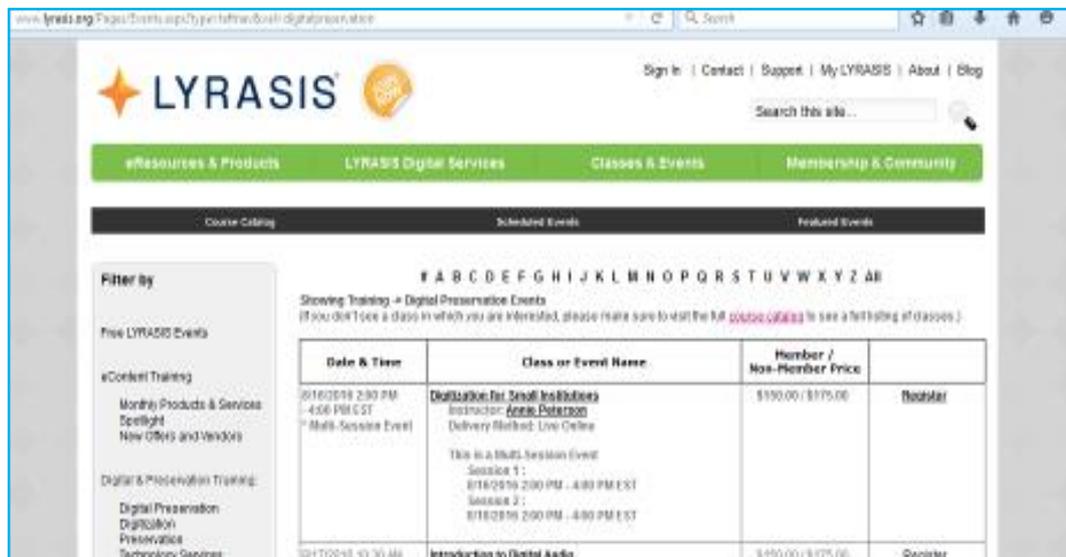


Figure 3.18: LYRASIS: an Academic Consortium of U.S.

3.3 Conclusion

Global state-of-the-art review of digital library education is significant and increasingly growing field of research. In order to update and expand the results, more comprehensive research is needed on a larger scale to collect data from every school of LIS and computer science. The global scenario of learning and teaching is changing very fast. The digital library education is affecting these transformations by making suitable changes in its teaching-learning methods. Acceptance of online learning in digital libraries is a strong sign of this response. Online sources for education and learning are growing rapidly day by day. Accessibility of adequate and appropriate facilities will put in energy to online learning on digital libraries. The role and sustainability of online courses in future perspectives cannot be denied. MOOCs will emerge as a powerful method for teaching and learning. It will not hypothetical to say that traditional class-rooms may be replaced by open online education system (MOOCs) in near future. There is need to build good models for digital library educational programmes and courses, as well as more collaboration between digital library research and education. And also, there is a need is financial capital to build and maintain an evolving and far-reaching digital library education programmes.

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Digital Library Education and Training Opportunities: World Wide

S. No.	Country	Institution /University	Course Title	Department	Level	Programme details	On Campus / Online mode	Website URL
1.	US	University of Illinois	Digital Libraries Concentration	School of Information Science	Certificate	32 credit hours of coursework Completion of a CAS-DL project for 8 credit hours Oral examination	Both – On Campus and Online	https://ischool.illinois.edu/degrees-programs/certificate-advanced-study-cas/cas-digital-libraries
2	USA	The Catholic University of America	Digital Libraries	Department of Library and Information Science	Post Graduate	All courses are three (3) credits. Total minimum required credits for graduation is 36 credits (12 courses).	On Campus	https://lis.catholic.edu/academics/courses-of-study/digital-libraries/index.html
3.	US	University of Wisconsin-Milwaukee	Certificate of Advanced Studies Digital Libraries – CAS	School of Information Studies	Certificate	Total 15 credits of course A minimum of 12 credits must be taken in the School of Information Studies. Up to 3 credits may be taken in another school or department of the University of Wisconsin-Milwaukee.	On Campus	https://uwm.edu/informationstudies/academics/certificates-cas/digital-libraries/

4.	US	Indiana University-Purdue University at Indianapolis (IUPUI)	Digital Libraries Course	School of Informatics and Computing - Dept. of Library and Information Science	Post Graduate level	13 Week Course No credit system Online mode of instruction including web-based readings and resources, threaded discussions, plus online presentations, and activities)	Online	https://soic.iupui.edu/syllabi/LIS-S652-Lamb.pdf?02172021
5.	US	Florida State University	Digital Libraries Course	College of Communication School of Information	-	16 weeks course Pre- or Co-requisite: LIS 5703 Information Organization	Online	https://ischool.cci.fsu.edu/files/2019/02/lis5472_digital_lib_online.pdf
6.	US	Drexel University	Master's in Digital Content Management (MSI)	College of Computing & Informatics	Master level	This program is organized into four 10-week quarters per year (as opposed to the traditional two semester system) One semester credit is equivalent to 1.5 quarter credits.	Both On-Campus and Online	https://www.online.drexel.edu/online-degrees/information-sciences-degrees/msi-digital-content-management/index.aspx
7	Europe	University of Naples – ITALY	Digital library in principle and practice	MOOC Teacher - Anna Maria Tammaro	Certificate	This course is offered with the option to earn a Course Certificate and 1 credit (ECTS) to be recognized by the International Master DILL (Digital Library Learning) jointly	Online	https://platform.europemoocs.eu/course_digital_library_in_principle_a

						delivered by the universities of Tallinn and Parma This MOOC has 7 weeks of study time, with 8-10 hours a week of workload		
8.	Europe	Oslo University College (Norway), Tallinn University (Estonia) and Parma University (Italy).	DILL - International Master in Digital Library Learning	It is a cooperative project between Oslo University College (Norway), Tallinn University (Estonia) and Parma University (Italy).	Master	DILL (International Master in Digital Library Learning) is a two-year Master Programme for information professionals who intend to work in the complex world of digital libraries.	On Campus /online	http://ecahe.eu/w/index.php/DILL_-_International_Master_in_Digital_Library_Learning
9	Australia	Australian Library and Information Association (ALIA)	Practical digitisation skills	ALIA	Certificate	3 Weeks practical short-term course \$270 members, \$399 non-members	Online	https://www.alia.org.au/training

10	US	University of Pittsburg	Master of Library and Information Science (MLIS) Online	School of Computing and Information	Master Level	4 years	Online	http://www.ischool.pitt.edu/lis/degrees/mlis-online.php
11	USA	The University of Arizona	Digital Information Management (Certificate NDP)	School of Information (Graduate College)	Graduate	All students are required to complete certificate coursework within 4 years.	Online	https://grad.arizona.edu/catalog/programinfo/DIGCRTG
12	Canada	Mohawk College	Libraries and Digital Technologies Post-Diploma Certificate	Ontario College Graduate Certificate	Certificate	each course is 10-15 hours per week (4 Months)	Online	https://www.mohawkcollege.ca/ce/programs/community-services-and-support/libraries-and-digital-technologies-certificate-965
13	US	Rutgers, The State University of New Jersey	MI in Digital Libraries	School of Communication and Information	Master Level	2-3 Years course 36 credits essential to earn degree.	Online & On-Campus	https://comminfo.rutgers.edu/mi/completing-a-degree-online.html
14	USA	San José State University (SJSU), California	Advanced Certificate in Digital Assets and Services	School of Information	Certificate Course	2 Semester	Online	http://ischool.sjsu.edu/programs/advanced-certificate-strategic-management

Curriculum of Digital library (DL) Courses at International Level

S. No.	Country /Region	University/ Department	Course Content on digital library/ Curriculum of DL course)
1.	USA	The Catholic University of America Department of Library and Information Science	<ul style="list-style-type: none">• Organization of Information• Information Sources and Services• Information Systems in Libraries and Information Centers• The Information Professions in Society• Data on the Web• Foundations of Digital Libraries• Metadata• Information Architecture and Web Design• Database Management• User Interface Design and Evaluation• Collection Development and Management• Digital Curation• Management• Research Methods in Library and information science• Practicum• Programming for Web Applications• Copyright and Licensing Institute
2.	United States	University of Illinois School of Information Science	<ul style="list-style-type: none">• Systems Analysis and Management• Digital Libraries• Information Modelling and;• Metadata in Theory and Practice

3.	United States	University of Wisconsin-Milwaukee School of Information Studies	<ul style="list-style-type: none"> • Digital Libraries • Metadata • Digital Information Services • E-Publishing & Web Design • Video Storage, Retrieval, and Preservation • Thesaurus Construction • Information Architecture • Online Information Retrieval • XML for Libraries • Information Storage and Retrieval • Multimedia • Electronic Networking and Information Services • Legal Issues for Library and Information Services • Fieldwork in Library and information science • Independent Research
4.	United States	Indiana University-Purdue University at Indianapolis (IUPUI) School of Informatics and Computing - Dept. of Library and Information Science	<ul style="list-style-type: none"> • Overview of Digital Libraries • Collection Development and Preservation • Digital Objects (textual documents, images, audio, video) • Organization and Representation of Information • Information Architecture • Information Access, User Behaviour and Interaction • Services • Management and Evaluation • Issues • Digital libraries and the future

5.	United States	<p style="text-align: center;">Florida State University College of Communication School of Information</p>	<ul style="list-style-type: none"> • Course Overview • What is a Digital Library? • DL Project Management • DL Applications • Omeka Practice • DL Collection Development • DL Digitization • DL Metadata • DL Interfaces • DL Users • DL Evaluation • DL Issues • DL Future • DL Practice • DL Presentation • Project Completion & Final Report
6.	United States	<p style="text-align: center;">Drexel University Online, Philadelphia College of Computing & Informatics</p>	<ul style="list-style-type: none"> • Information Innovation through Design Thinking • Foundations of Data and Information • Database Management Systems • Information Retrieval Systems • Information Visualization • Enterprise Content Management • Applied Ontology • Principles of Cybersecurity • Perspectives on Information Systems • Introduction to Web Design for Information Organizations • Applied Artificial Intelligence • Introduction to Data Analytics • Archival Access Systems • Electronic Records Management • Capstone Project
7.	Europe	<p style="text-align: center;">University of Naples MOOC Digital library in principle and practice</p>	<ul style="list-style-type: none"> • Introduction and welcome! • What are digital libraries? • How can you use a digital library? • How can you create a digital library? • Associating resources and virtual spaces to evidenced learning need

8.	Europe	Oslo University College (Norway), Tallinn University (Estonia) and Parma University (Italy) Joint Programme – DILL International Master in Digital Library Learning	<ul style="list-style-type: none"> • Digital Documents (Oslo) • Research Methods and Theory of Science (Oslo) • Information and Knowledge Management (Tallinn) • Human Resource Management (Tallinn) • Access to Digital Libraries (Parma) • Users and Usages of Digital Libraries: Quantitative and Qualitative Evaluation (Parma) • Thesis (either of the partners)
9.	USA	The University of Arizona Graduate College	<p>Course: Digital Information Management (Certificate NDP)</p> <ul style="list-style-type: none"> • Digital Curation and Digital Preservation Introduction to Applied Technology • Managing the Digital Information Environment • Digital Information Management Capstone • Advanced Digital Collections • Database Development and Management • Health Information in Ethnic-Cultural Communities • Data Standards for the Semantic Web • Data Management in Healthcare Systems
10.	Canada	Mohawk College Ontario College Graduate Certificate	<p>Course: Libraries and Digital Technologies</p> <ul style="list-style-type: none"> • Introduction to Metadata & Metadata Applications • Strategies for Instruction for Library Technicians • Online Searching • Resource Description and Access • Library Leadership in the Digital Age • Issues in Digital Resource Management and Technologies • Digital Media in Libraries
11.	United States	University of Pittsburg	<p>Course: Master of Library and Information Science (MLIS)</p> <ul style="list-style-type: none"> • Digital Libraries in Their Communities • Digital Humanities

CHAPTER – 4

DIGITAL LIBRARY EDUCATION AND TRAINING OPPORTUNITIES IN INDIA

4.0 Introduction

Library and information science education in India is currently in transitional and revolving phase and, with a multidisciplinary approach, has become a rapidly emerging subject. Today, not only does LIS education cover the basic topic of the library, but it has also been expanded to subjects such as digital libraries, information communication technology's applications, computer and mathematics, information science, management studies, and research (Jain et al., 2007). Due to the influence of modern technologies, the world is undergoing rapid change in all spheres of all human endeavour. This technological innovation is having a tremendous impact on all stages of learning and education, especially in crucial areas such as advanced education and training. The massive impact of digital technology has given rise to many digital libraries across the world. Digital libraries play a major role in education and training, research and learning within educational institutions (Anasi, 2012).

Since independence there has been lot of changes regarding nomenclature of the library schools in the country incorporating information in their names; inclusion of technological components in the course curriculum; demand for job-oriented skills to be employed among the pass out; student pass out employability ratio; library-department partnership for practical orientation; accreditation of library schools and courses, etc. The chapter seeks to address the challenges of current library and information service environment and need for preparing managerial skills/competencies among LIS professionals in digital library environment. The role of the University Grants commission is important in incorporating various themes in the syllabi of various Universities in the country. Its effort in inclusion of 'digital library' concepts in curriculum has been analysed. An investigation has also been made in regard to 'digital library' as component in syllabi of various library schools and also the areas of digital libraries included in the 'ICT applications in Library and information science' papers.

4.1 Library and Information Science Education in India

It has been more than a century since the education of library and information science began in India. It is said that for the first time in the country, in the year 1911, WA Borden started a training programme in Baroda for the management of libraries in the library system. Thereafter, several library institutions, library associations, and other libraries organized short term training programmes for working librarians. In 1929, the Madras Library Association (MALA) introduced a regular certificate course in library science, which was continued on a regular basis by the University of Madras in 1931. The father of library science, Dr. S. R. Ranganathan introduced a one-year post-graduation diploma programme in library science subject in 1937 by replacing the Certificate Programme of Library Science at the University of Madras. It was from here that library and information science education started at the university level. Thereafter, Banaras Hindu University started the Post Graduate Diploma in Library Science in 1942 and Bombay University in 1943.

After this, the University of Delhi started a Post-Graduation Diploma in Library Science in 1947 which was later upgraded to a Master's degree in Library Science in 1949. After this many universities/institutions came forward to announce LIS courses at different levels and the number of institutes and the number of courses increased progressively. Presently about 130 universities/institutions are offering courses in Library and Information Science at various levels from certificate level to doctoral level. (ILA, 2020). A list of the Universities Departments (state-wise) offering Library and information science programmes has been annexed (*Annexure 4.1*).

Teaching of digital libraries has been the need to integrate in the LIS curriculum after invention of WWW in the country. During last two decades the focus of the LIS education has shifted to digital libraries, institutional repositories, networking, content management, knowledge management, consortia management, e-learning, etc.

4.2 Induction of Digital Library Skills in LIS Education

It is a recent phenomenon that practicing librarians knowingly or unknowingly are learning much from the digital libraries. The work of the digital librarian involves concepts such as selection of metadata, resolving copyright/intellectual property rights, acquisition of digital materials, management and creation of websites and web

resources, digital information retrieval, developing web interfaces, online access, digitization, database creation and maintaining, networking, etc. The need is that the LIS education should acquaint its learners with these skills and competencies to make them good digital librarians. Shahbazi & Hedayati (2016) identified various job titles of modern techno-savvy librarian. These job titles are based on following themes of new services of modern libraries (Table 4.1):

Table – 4.1: Themes for Job Titles of Newly Emerging IT-Based Librarian

• Data	• Electronic resources	• Integrated technologies
• Database	• Electronic resources management	• Library systems programme
• Digital and web services	• Electronic services	• Media assets
• Digital archives	• Electronic/web services	• Media services
• Digital assets	• Emerging technologies	• Metadata and catalogue
• Digital collections	• E-resources	• Online services
• Digital initiatives	• Global data	• Reference and electronic resources
• Digital media	• Information literacy	• Resource sharing
• Digital resources	• Information services	• Software
• Digital services	• Information technology	• Systems and web
• Distance services	• Information technology	• Web and user interface
• Electronic information	• Instructional technology	• Web services

A variety of competencies, such as skills, technical knowledge, and personal characteristics, are very essential for library workers, which enable them to make a positive contribution to their organizations and library profession and to work themselves in the modern digital environment.

Shahbazi & Hedayati (2016) classified today's modern techno-savvy LIS job titles into 4 major job groups in the international job market. Total number of 33 knowledge and

skills categorized in to 4 major job groups are required for “Digital Librarian/Digital Services Librarian/Digital Resources Librarian”. These Core Competencies apply to all digital librarians.

I. “Computer basics” Knowledge and Skills

Knowledge of basic concepts of computers & Windows operating system; Knowledge and skills of Paint software; Knowledge and skills related to the keyboard, fast typing, and MS Word; Knowledge and skills: hiding files, common file convertor software, locking folder and hard disk, download management software, file compression software, creating virtual drives, DVD burning software, creating files in GIF, Pdf, and Doc formats; Knowledge and skills: installing and using windows operating system (the latest versions), Windows troubleshooting, principles of the hardware driver installing (graphics card, audio card, printer, scanner, etc.), and their troubleshooting; Knowledge and skills of the Publisher software; Knowledge and skills of systems and files recovering through special software such as Acronis True Image; Knowledge and skills of PowerPoint.

II. “Internet Operating, Databases, And Digital Services/Resources” Knowledge and Skills

Knowledge and skills of searching methods (basic and advanced) in databases and the Internet, developing and limiting searching and improving the results; Knowledge and skills of information seeking consultation (through calls, email, chat, etc.)’ Knowledge and skills of databases (Science Direct, Ebsco, John Wiley, ProQuest, Ovid, Emerald, Google Scholar, Medline, etc.) and registration procedure; Knowledge and skills: search engines and web directories; Knowledge and skills of digital resources collection development; Knowledge of digital resources dealers and suppliers; Knowledge of web 2.0 services (social networks, Wikis and Weblogs); Knowledge of general reference materials & services in the digital environment; Knowledge of specialized reference materials & services in the digital environment; Knowledge of free scientific resources websites (reference sources, articles, movies); Familiarity with digital environment and intellectual property rights laws; Fundamentals of digital libraries & information centres management; Familiarity with scientific resources producing Centers; Knowledge and skills of information services

marketing; Knowledge of information economics; Knowledge of professional ethics in the digital environment.

III. “Website Designing & Management” Knowledge and Skills

Knowledge of web designing basic concepts, including: domain name, hosting, URL, IP address, FTP, hyperlink, subdomain, free hosting, website, webpage, homepage, link, bandwidth, RSS, podcast, cookie file, multimedia, etc.; Knowledge and skills of website designing software (web portal software; Knowledge and skills of creating & editing graphic files with Photoshop; Knowledge of DHTML/CSS; Knowledge of hosting and domain name registration; “knowledge and skills of file transferring to web servers; and knowledge of free web designing services (including free codes for web developing, adding calendar, user counting, vertical and horizontal navigation menu codes to websites, etc.; Knowledge and skills of web page designing with Expression Web or Front Page; Knowledge and skills of web designing with Adobe Dreamweaver.

IV. “Computerized Cataloguing and Library Software” Knowledge and Skills:

Knowledge and skills of Integrated library systems (for example: CONTENTdm ILS, Millennium ILS, and DSpace ILS; Knowledge and skills of metadata, Organization and Classification tools such as MARC, OCLC, Dublin Core, METS/MODS, LC/NLM, and LCSH.

Despite having the same curriculum, the scope and level of courses taught in different universities are different. Somewhere the level of content taught is of advanced level and somewhere at the very basic level. Because of this, after getting a degree from these universities, these students fail at the level of technical or research. The modern digital environment of the 21st century has revealed a variety of skill requirements from Library and Information Science (LIS) professionals, including IT skills, technical skills, managerial skills and so on. Library users are increasingly relying on LIS professionals for assistance and advice to meet their information needs. For this, LIS professionals need to develop their skills and competencies at an advanced level, which can be complemented by participating in various continuous training programmes like workshops, conferences, seminars, seminars etc. (Jain et al., 2007).

4.3. Need of Digital Library Education

The nature and functions of a services profession are subject to the requirements of the users of their service and the resources that are to be served. Even a slight change in any of these two factors, necessitate change in the functions of the professional. In past few decades, the pace of change in these factors has constantly been on rise (Troll, 2001). This phenomenon calls for more systematic and consistent efforts towards making the curriculum contents up to date so that a new professional going through certain learning experience feels confident enough to provide certain learning experiences feels confident enough to offer right services to the right user using right sources and at the right time.

In order to meet the issues and challenges of the strong forces that are operating to change the character of library profession, LIS education must be built upon sound intellectual foundation & the librarian needs such training & education which may plant in-him the seeds of professional competence. The library and information science schools or department should produce an efficient organizer and able administrator and a person who understands the users of the library & their problems. He should have the knowledge of approach to various funding agencies and to become guide, friend and philosopher' to users. Besides these the use of IT application in organization of information sources should be thoroughly by professionals (Satarkar and Aghav, 2006).

Sreenivasulu (2000) considers that the evolving worldwide digital libraries or digital knowledge centers are generating the need to establish a new digital librarian job title to handle their digital libraries. Large digital libraries are developing as warehouses of information. The management of digital libraries includes: digital librarians; the organization of digital knowledge and records; the distribution of digital computerized digital data; the provision of digital reference services and electronic information services; the providing of information mining from emergent information stores; the tasks of major digitalization, digital storage, and digital storage processes. A digital librarian's competence is reflected by several sets of abilities, attitudes, and beliefs that allow a digital librarian to operate as a digital information professional, digital knowledge worker, and digital knowledge communicator. Management of the digital

libraries refers to the overall competencies required in digital libraries or any sort of information to generate, store, interpret, establish, save, and circulate digital data (text, pictures, sounds). The following ideas are presented to better understand the functions of the digital librarian in order to identify them.

- Guardian of information super highway (ISH)
- Caretaker of the worldwide digital library
- Digital librarian performances as interdependent human-machine guru
- Navigation, browsing and filtering
- Multimedia search and indexing
- Knowledge and data mining
- Search and retrieval co-ordination
- Digital librarian's role in management of digital information system (DIS) and other interface functions
- Digital data access

4.4 Digital Library Concept and Components in LIS Curricula

Yadav & Gohain (2015) mentioned that many LIS departments of Indian universities are now also offering digital library courses like MLISc and P.G. Diploma in Digital Libraries (University of Calcutta); Post Graduate Diploma in Digital Library & Information Management (PGDLIM) – e-learning mode by Tata Institute of Social Sciences (TISS), Mumbai; Digital Library Training programme by National Institute of Science Communication and Information Resources (NISCAIR), New Delhi etc.

Table – 4.2: Digital Library Related Topics in LIS Programmes

Author (s)	Course	Digital Library related
<i>Yadav & Gohain (2015)</i>	<i>MLISc & P.G. Diploma</i>	<i>Digital Libraries</i>
<i>Nayek & Bhattacharya (2016)</i>	<i>MLISc</i>	<i>Networking, content management system, web 1.0, web2.0, web3.0 etc.</i>
<i>Karisiddappa (2014)</i>	<i>Extension education programmes</i>	<i>Digital library and the other modern trends of developments namely, the open access, information literacy and library networking.</i>

A case study of the library and information science (LIS) syllabuses of three major state universities/institutions of India has conducted by Nayek & Bhattacharya (2016). Three universities of West Bengal (University of Calcutta, Jadavpur University and Rabindra Bharati University), one of Karnataka (Documentation Research and Training Centre) and one of Delhi (IGNOU, an open university) have considered for the study. In present, Digital library course content have been taught in all these the Universities. The most valuable course material, accompanied by networking, content management system (CMS), web 1. 0, web 2. 0, web 3. 0, etc., seems to be the Digital Library. The effect on the job market of the newly added LIS course content is difficult to determine, but steps have been taken to meet the demands of the job market.”

Karisiddappa (2014) considers that Library and information science since the ideas of Digital Library and Information Literacy are surfaced, everywhere there are conferences and seminars on these topics and theoretically rich papers are submitted. There are only a few case studies on Digital Library and Information Literacy projects in India. But there is extreme interest evinced in Open Access and Institutional Repositories (IRs). However, it is commendable that LIS faculty have benefited with the assimilation of tremendous knowledge on Digital Library and other areas, but how often one would know the nuances of digitization process. A pre-requisite for this course would be foundations of Archival Studies, Preservation and Conservation. For Information Literacy, it would be apt to include and focus on user related studies.

4.5. Digital Library Concept and Components in UGC’s Model Curriculum

University Grants Commission (UGC) set up a review committee on Library Science in 1961 under the chairmanship of Dr. S.R. Ranganathan to assess and suggest measures to improve the standards of library science education In India. The Committee submitted its report in 1965. The report mentions that “the need for a well-trained staff to administer the libraries can hardly be over emphasized” (Library Science in Indian Universities, 1965). The committee studied the existing facilities of teaching and research and found that:

- The concepts of digital libraries emerged from impact of ICT. After the invention of internet and www the area of ICT have become in broad. The UGC model curriculum (2001) highlighted digital libraries as part of ICT in Library and information science subject. Some recommendations and comment on ‘digital

libraries' as part of information communication technology in syllabus of LIS in UGC model curriculum, are as follows:

- In the present age of information, librarians are left with no option other than to own essential competencies to human information with the aid of IT tools and techniques. And as such it is the accountability of LIS schools to bring essential change in their curriculum by integrating in the theoretic and hands-on aspects of computerization and networking including software development, database management, information search through national and international networks, CD-ROM, digital libraries, electronic publishing and so on.
- There is a need to emphasize on two years integrated programme preventing duplication of course content of BLIS and MLIS, in which there is a need to impart practical knowledge covering various aspects of automation including Information Technology and its applications.
- The curriculum emphasizes intensive as well as extensive hands-on practical information on the use of information technology applied to Library and information science. The departments should be equipped adequately in order to enable the students to acquire the knowledge and skills in the use; of IT tools and services. For this purpose, an IT laboratory with network facilities be established in the department with user terminals at the ratio of 1:5 (i.e., one terminal for every five students). This should be supported with all the standard software packages including one or two library application software packages.

The Curriculum Development Committee (CDC) desired to follow the modular approach to the curriculum. Accordingly, the Committee prepared 6 core modules and 1 module on electives. The worked-out modules are listed below:

Table – 4.3: Modules of Library and Information Course Prepared by Curriculum Development Committee (CDC-2001)

Module -1:	Foundations of Library and Information Science
Module -2:	Knowledge Organization, Information Processing and Retrieval.
Module -3:	Information Sources, Products and Services
Module -4:	Management of Library and Information Centers/institutions

Module -5:	Information Technology: Basics and Applications
Module -6:	Research Methods and Statistical Techniques
Module -7:	Electives: information Systems

- One objective of Module number – 5 is focused on digital libraries that *“To identify major issues in the development of new technologies in libraries, such as the digital libraries and virtual libraries, and discuss their implications.”* A separate unit is given in this module -5 which is completely based on contents of ‘**digital libraries**’

<u>Unit-VII: Digital Libraries</u>
<ul style="list-style-type: none"> • Genesis, Definition, Objectives and Scope;
<ul style="list-style-type: none"> • Image Formats: JPEG, GIF/BMP etc;
<ul style="list-style-type: none"> • Audio Formats: WAV, MIDI, MP3 etc.;
<ul style="list-style-type: none"> • Audio Formats: MPEG, AVI, Quick Time;
<ul style="list-style-type: none"> • Storage Media Formats: ISO 9660, DVD;
<ul style="list-style-type: none"> • Software-Digital Library Software, OCR and Image Editing Software: Input Capture Devices: Scanners. Digital and Movie Cameras;
<ul style="list-style-type: none"> • Data Warehousing, Data Mining and Meta Data concepts.

The report of “UGC model curriculum of library and information and information science” (CDC-2001) concluded that it can be expressed with serious concern that there is an unfavourable growth of LIS courses at all levels in the country, in contrast to what is happening in other countries such as the United States, the United Kingdom, Australia, and so on, where LIS schools are either abandoned or merged with departments offering high-profile courses to improve their marketability. It is a reverse process in the Universities and other bodies in the country. In view of recent events on the world stage, it is necessary to revitalize India's LIS programmes. The subject panel of UGC and the curriculum and it is obligatory on the part of the departments to consider its adaptation in the right earnest.

Table – 4.4: UGC Efforts: LIS Education & Curriculum Development

S. No.	UGC Efforts (Committees)	Chairman	Year	Implications and highlights	Remarks
1.	<i>Ranganathan Committee on University and College Libraries</i>	Dr. R.S. Ranganathan	1957	Importance of University and College libraries and teaching of Library and Information Science	Title of report published by UGC (1965): “Development of University and College Libraries”
2.	<i>Ranganathan Committee on Library Science Education</i>	Dr. R.S. Ranganathan	1960	Recommendations relating to objectives, Curricula, admission, qualifications, and minimum qualifications for teaching posts and other related areas for B.Lib.Sc., M.Lib.Sc. and Ph.D. courses.	Report published by UGC (1965) under the title: “Library Science in Indian universities”
3.	<i>Kaula Committee on Curriculum Development in LIS Education</i>	Prof. P.N. Kaula	1990	Historical sketch and status of library and information science in India and Prepared Model Curriculum for different levels of Library and Information Science courses conducted in Indian Universities, Viz. BLISc, MLISc, Integrated MLISc, Ph.D. and special courses	Report published by UGC (1992) under the title: “Report of Curriculum Development Committee on Library and Information Science
4.	<i>Subject Panel on Library and</i>	Prof. C.R. Karisiddappa	1997	Immediate restructuring of	Report of meetings were

	<i>information science</i>			CDC Report in the wake of rising impact of information technology on libraries, as highlighted earlier	exclusively devoted to restricting of Library and information science syllabi of different departments of LIS in the country.
5.	<i>Karisiddappa Committee on Curriculum Development in LIS</i>	Prof. C.R. Karisiddappa	2001	Finalizing of the modules and course contents. Three groups were constituted by UGC to give Model syllabus a final stage. 2 years integrated programmes of MLISc	This was second Curriculum Development Committees (CDC) to framed the syllabus to bring standardization in LIS education in India.

4.6 Teaching of Digital Library in Indian LIS Schools

An analysis of syllabi of 52 Library and information science schools responded to the survey and syllabi information retrieved from websites of others have been analysed here regarding various aspects of digital library education.

4.6.1 Nomenclature of the Digital Library Related Paper

There are different nomenclatures for the papers taught in BLIS and MLIS. But, while studying the syllabi of different universities, there are various nomenclatures and practices found regarding teaching of ‘digital libraries’ related papers. The paper on ‘digital libraries’ was found in MLIS course in many Universities like Aligarh Muslim University, U.P. BBAU, Agra, Banaras Hindu University (BHU); Delhi University, University of Rajasthan, Vardhman Mahaveer Open University, Kota; Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.); Manipur University, etc. Some universities teach ‘digital library’ related content as units of paper in BLISc course e.g. IGNOU, New Delhi, Aligarh Muslim University, U.P.; HS Gour University, Sagar, etc. and Digital Library as a core paper is taught by Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.); etc. Osmania University, Hyderabad and Central University of Gujarat conducts a

special programme “PG Diploma in Digital Information Management”. This is one-year programme with 2 semesters. CSIR-National Institute of Science Communication and Information Resources (NISCAIR), New Delhi have been organized specialized certificate courses on digital libraries “Design and Development of Institutional Repositories using DSpace – Basic & Advance”.

In MLISc course, the nomenclature of the paper taught as core paper, which completely related to digital libraries was found as include: Digital Library System/ Digital Libraries/ Digital Library Management/ Digital Libraries: Fundamentals/ Content Management & Digital Library/ ILMS and Digital Libraries, etc., such universities include: Central University of Haryana, Assam University, Silchar; University of Burdwan; University of Calcutta, Kolkata; Jadavpur University; Central University of Punjab, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.), HS Gour University, Sagar; Mizoram University; North Eastern Hill University (NEHU), Meghalaya; Pondicherry University; Tripura University; Acharya Nagarjuna University, A.P.; etc.

Table - 4.5: List of Different Nomenclature of Digital Library Related Paper in Syllabus of Indian LIS Schools

Universities	Course	Nomenclature of Paper	Core paper / Units in Paper on DL
<i>Aligrah Muslim University, U.P.</i>	MLISc	Paper -VI: Information Technology (Theory) – II	Units in Paper
	BLISc	Paper-II: IT Applications in Libraries (Theory)	Units in Paper
<i>Assam University, Silchar</i>	MLISc	Digital Library and Web Technology (Theory)	Core Paper
<i>University of Burdwan</i>	MLISc	Paper Code: LS-CC-402: Digital Library System	Core Paper
<i>Central University of Haryana</i>	MLISc	Digital Libraries (Theory)	Core Paper
<i>University of Calcutta, Kolkata</i>	MLISc	Paper -901: Digital Library and Related Concepts Paper 1001L Digital Library Management (Practice)	Core Paper
<i>Jadavpur University</i>	MLIS in Digital Libraries	Whole course	Core papers (Whole course)
<i>BBAU, Agra</i>	MLISc	Paper MLIS202: Information Technology: Applications	Units in Paper

<i>Banaras Hindu University (BHU)</i>	MLISc	Paper XII: Information Technology and System Design	Units in Paper
<i>Central University of Punjab</i>	MLISc	LIS.553 & LIS.555: Library Automation and Digital Library	Core Paper
<i>Central University of Punjab And TATA Institute of Social Sciences</i>	PGDLIM	PGDLIM (Whole Course) Post-Graduation Diploma in Digital Library and Information Management	Core papers (Whole course)
<i>Delhi University</i>	MLISc	Paper: M-104 Information and communication technology applications in LIS (Theory)	Units in Paper
<i>Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)</i>	MLISc	Generic Elective (GE) GE1: Digital Libraries: Fundamentals	Core Paper
		Information Technology: Application (Theory)	Units in Paper
	BLIS	GE2: Digital Library: Fundamentals	Core Paper
<i>HS Gour University, Sagar</i>	BLISc	LIS-CC-113: Library Information Technology	Units in Paper
	MLISc	LIS CC- 225: Digital Libraries	Core Paper
<i>University of Rajasthan</i>	MLISc	ICT Applications in Library and Information Science	Units in Paper
<i>Vardhman Mahaveer Open University, Kota</i>	MLISc	MLIS-07 Application of Information Communication Technology in Libraries	Units in Paper
<i>Indira Gandhi National Open University, New Delhi</i>	BLISc	BLIE 229: ICT IN LIBRARIES	Units in Paper
<i>Manipur University</i>	MLISc	MLIS-303 ICT Application in LIS (Theory)	Units in Paper
<i>Mizoram University</i>	MLISc	Content Management & Digital Library- Theory	Core Paper
<i>North Eastern Hill Univeristy (NEHU), Meghalaya</i>	MLISc	LIS- C-402: Digital Libraries	Core Paper
<i>Pondicherry University</i>	MLISc	LISC425 – ILMS and Digital Libraries	Core Paper
<i>Tripura University</i>	MLISc	1002C: DIGITAL LIBRARY THEORY AND PRACTICE	Core Paper
<i>Acharya Nagarjuna University, A.P.</i>	MLISc	PAPER-304: DIGITAL LIBRARIES	Core Paper

4.6.2 Digital library Areas in the Syllabi

It is evident that the teaching of “digital libraries’ has been integral part of the library and information science syllabi. In the beginning mainly it restricted with the basics

of information communication technology which mainly dealt with different digital library related topics e.g., Digitization; Digital preservation; Digital & Virtual library-concept & features; Genesis, Definition, Objectives, and Scope of Digital Libraries-Hardware Examine digital library software such as Greenstone and D-Space, as well as file formats such as text, audio, video, and image. OCR, Image editing software, Input Capture Devices: Scanners, Digital Movie Cameras;” Digital Library Software: Greenstone, e-prints, D-Space; Developing Digital Library; Institutional Repository; Creation of Digital Documents with Metadata, and so forth. These topics/contents are covered in BLISc and MLISc digital library related publications. Now many universities have been taught as a separate core course on “digital libraries”. A details list of state-wise Indian LIS universities with ‘digital libraries’ related paper papers (core / units in paper) and DL contents/ topics has been annexed. (*Annexure – 4.2*)

4.7 Continuing Education Programmes (CEPs) on Digital Libraries in India

After completing the professional degree at bachelor's and master's levels from any University or Institution, professionals having a need to update their knowledge and skills in changing scenario. Library and information science professionals can full fill this gap of their such needs through different types of continuing professional education (CPEs) development programmes, such as Seminars; Workshops; Conferences; Lectures; Webinars; Short-term training courses; etc. Many continuing professional education programmes in digital libraries have been conducted in different parts of the country. Here, such programmes have been analyzed which based on the announcements related to continuing professional education on digital libraries made on the Indian LIS listserv called LIS Forum.

4.7.1 Year-wise Continuing Education Programmes (CEPs) on Digital Libraries in India

Figure 4.1 depicts that in the year 2016, the maximum numbers of programmes (i.e., 17) and 12 programmes were communicated during the year 2008 on the LIS-Forum. Otherwise, it ranged from a three to ten digital library continuing education and training programmes for the other years.

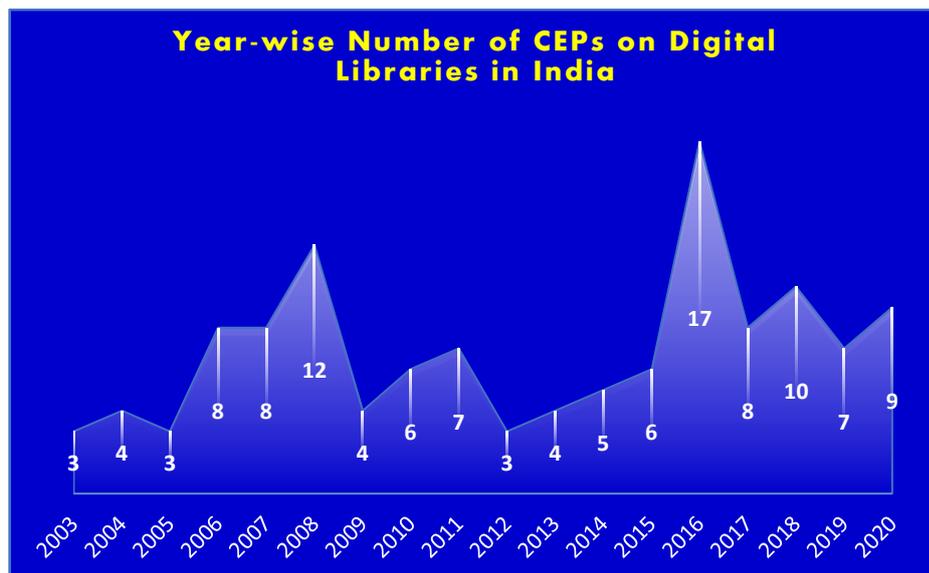


Figure 4.1: Year-wise Continuing Education Programmes (CEPs) on Digital Libraries in India

4.7.2 State-wise Distribution of Continuing Education Programmes (CEPs) on Digital Libraries in India

Table 4.6 represents state-wise distribution of continuing professional education programme on digital libraries in India during the period of 2003 to 2020. The maximum numbers of 30 programmes were held in Karnataka state. Findings of previous study showed that Karnataka is having highest number of ETD repositories in India (Khaparde & Ambedkar, 2014). In Andhra Pradesh, Assam, Mizoram, Sikkim and Rajasthan, only one programme in each state was held during this period. Graphical representation of state-wise numbers of CEPs on digital libraries in India have also showed in Figure 4.2.

Table – 4.6: State-wise Distribution of CEPs on Digital Libraries in India

S. No.	State	No. of CEPs
1	Andhra Pradesh	1
2	Assam	1
3	Delhi	24
4	Gujarat	10
5	Jammu & Kashmir	2
6	Jharkhand	1
7	Karnataka	30
8	Kerala	16
9	Maharashtra	8
10	Mizoram	1

11	Odisha	3
12	Rajasthan	1
13	Sikkim	1
14	Tamil Nadu	13
15	Telangana	3
16	Utter Pradesh	3
17	West Bengal	6
Total		124

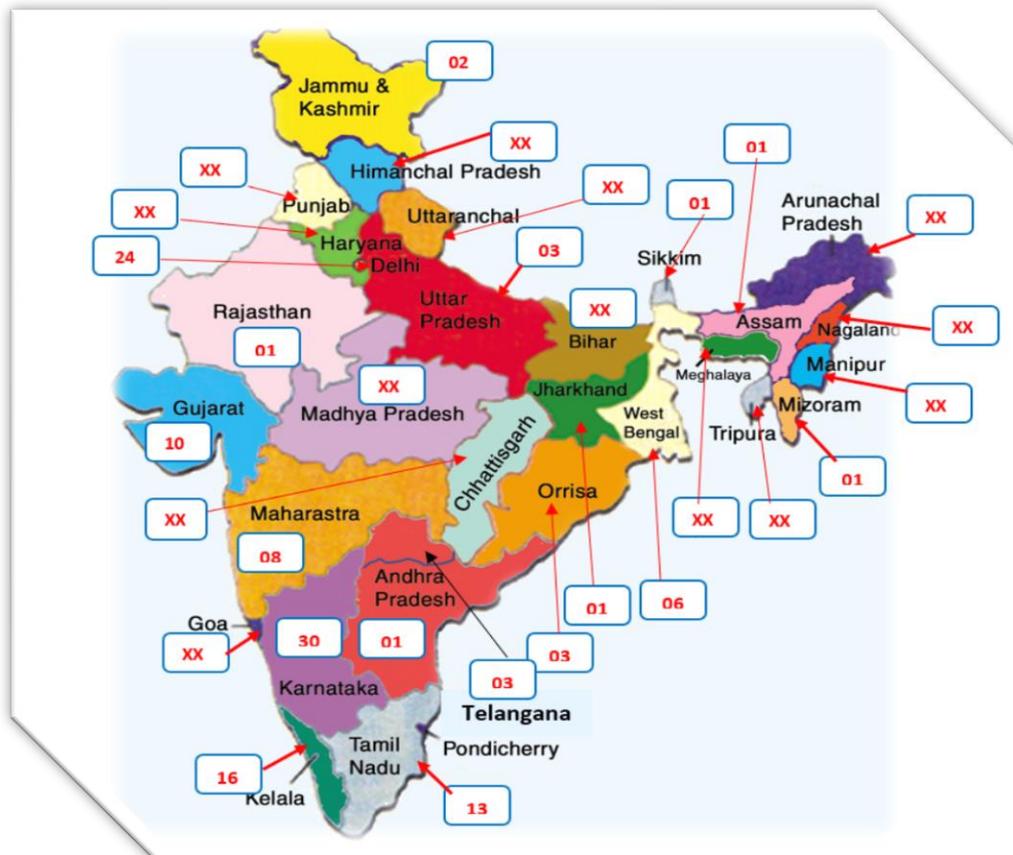


Figure 4.2: Graphical Representation of State-wise Distribution of CEPs on Digital Libraries in India

4.7.3 Duration of Continuing Education Programmes (CEPs) on Digital Libraries in India

Figure 4.3 shows that the continuing education programmes varied from 1 to 10 days. There was only one 10 days programme and 2 programmes were one year. About 72% of the programs were of 1 to 3 days of duration. It is seen that most of programmes were of one day (33), two days (29) and three days (28).

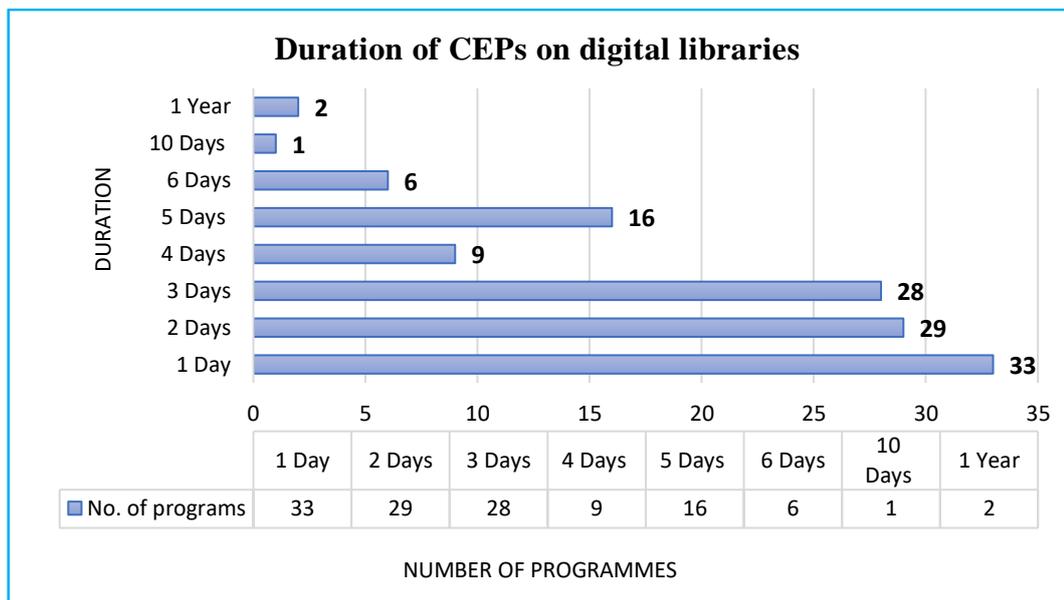


Figure 4.3: Duration of Continuing Education Programmes (CEPs) on Digital Libraries

4.7.4 Types of Continuing Education Programmes (CEPs) on Digital Libraries in India

Figure 4.4 gives the type of CEP programmes on digital library in India during the period of 2003 to 2020. Most of them were workshops (67). Although seminars (20), conferences (17), short-term training programmes (10), webinars (6), PG diploma (2), and lectures (2) were also held on digital libraries.

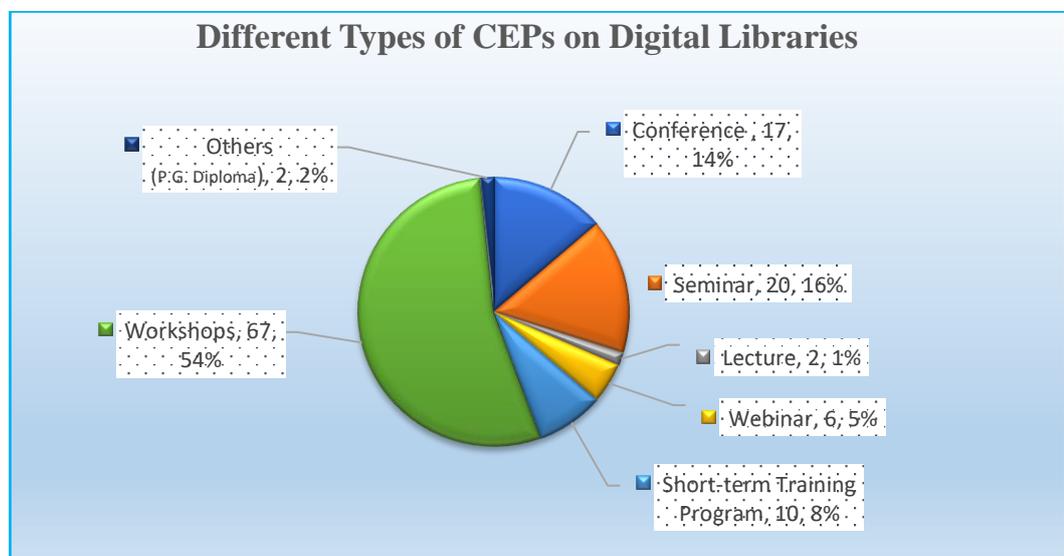


Figure 4.4: Types of Continuing Education Programmes (CEPs) on Digital Libraries

4.8. Conclusion

The attention of inclusion of the content related to ‘digital library’ in the curricula for Library and information science education in the country emerged in the beginning of the 21st century. The Committee on Model Curricula in Library and information science of the University Grants Commission included emphasized on the teaching of various concept related to digital libraries. On the study of the syllabi of different universities in the country it is found that there is no consistency over the nomenclature of the courses, inclusion of topics/units and various aspects covered in the topics/units. New and recent concepts are being incorporated but it has been done at a slower pace. Quite a few full fledge courses and papers are offered/ taught on area of “digital libraries”.

Education & training is very important for developing and increasing the competencies of library and information science professionals in recent digital and technological era. Many continuing education programmes (CEPs) are being organized on digital libraries for full fill their professional development needs in India such as workshops, webinars, lectures, seminars, short-term training courses, conference etc. LIS Forum is playing an important role in awareness and spreading information about these types of continuing education programmes (CEPs) in the term for the help of LIS students, learners, and faculty teachers. It is concluded that there is very slow rate of conducting professional development training programmes on digital libraries in the country.”

4.9 References

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Annexure – 4.1

List of Indian Universities/ Institutions which offering LIS Education in India

1. Central Govt. Universities/ Institutions = 19
2. State Govt. Universities/ Institutions = 74
3. Private Universities/ Institutions = 37

Total = 130*

Courses offered: CLISc, DLISc, BLISc, MLISc, Integrated MLISc, MSLIS, MPhil, 5-Year Integrated UG/ PG Programme with exit option on completion of 3 years UG Programme, PGDLAN, Ph.D.

Central Government Universities/ Institutions		
S.No.	Name of University/Institution	LIS Courses offered
1	Aligarh Muslim University, Uttar Pradesh	BLISc, MLISc, Ph.D. B.A. (Library Science as a Subsidiary subject)
2	Assam University, Assam	Integrated MLISc, MPhil, Ph.D.
3	Babasaheb Bhimrao Ambedkar University, Uttar Pradesh	Integrated MLISc
4	Banaras Hindu University, Uttar Pradesh	MLISc, M.A. in Manuscript ology, Ph.D.
5	Central University of Gujrat, Gujarat	M.L.I.Sc.
6	Central University of Haryana, Haryana	M.L.I.Sc
7	Central University of Himachal Pradesh, Himachal Pradesh	Integrated M.L.I.Sc
8	Delhi University, Delhi	B.L.I.Sc., MLISc, MPhil, Ph.D.
9	Dr Harisingh Gour Vishwavidyalaya, Madhya Pradesh	BLISc, MLISc, Ph.D.
10	Guru Ghasidas Vishwavidyalaya, Bilaspur, Chhattisgarh	5-Year Integrated UG/ PG Programme with exit option on completion of 3 years UG Programme, BLISc, MLISc, Ph.D.
11	Indian Statistical Institute (Documentation Research & Training Centre), Karnataka	MSLIS, Research Programmes
12	Indira Gandhi National Open University, New Delhi	PGDLAN, BLISc, MLISc, Ph.D.
13	Jamia Mallia Islamia, New Delhi	B.L.I.Sc.
14	Mahatma Gandhi Central University, Bihar	Diploma in Lib Sc, Diploma in Lib & Inf. Sc., B.L.I.Sc., M.L.I.Sc. MPhil
15	Manipur University, Imphal	Integrated MLISc, Ph.D.
16	Mizoram University	Integrated MLISc, MPhil, Ph.D.

17	North Eastern Hill University	Integrated MLISc, Ph.D.
18	Pondicherry University, Pondicherry	PGDLAN, Integrated MLISc, Ph.D.
19	Tripura University, Tripura	Integrated MLISc
State Universities/ Institutions		
S. No.	Name of University/Institution	LIS Courses offered
1	Alagappa University, Tamil Nadu	BLISc, MLISc, M.Phil, Ph.D
2	Andhra University, Visakhapatnam	Integrated MLISc, MPhil, Ph.D.
3	Assam Women's University, Assam	Integrated MLISc
4	Awadesh Pratap Singh University, Madhya Pradesh	BLISc, MLISc
5	B.R. Ambedkar University, Andhra Pradesh	B.L.I.Sc., MLISc
6	Babasaheb Bhimrao Ambedkar Bihar University, Bihar	B.L.I.Sc
7	Bangalore University, Karnataka	BLISc, MLISc, Ph.D
8	Barkatullah University, Madhya Pradesh	B.L.I.Sc
9	Bundelkhand University, Uttar Pradesh	BLISc, MLISc, M.Phil, Ph.D
10	Burdwan University, West Bengal	BLISc, MLISc, M.Phil
11	Calcutta University, West Bengal	BLISc, MLISc, 5 year Integrated MLISc, M.Phil, Ph.D
12	Calicut University, Kerala	Integrated MLISc, M.Phil, Ph.D
13	Devi Ahilya Vishwavidyalaya, Madhya Pradesh	BLISc, MLISc, M.Phil
14	Dibrugarh University, Assam	B.L.I.Sc., MLISc
15	Dr. Babasaheb Ambedkar Marathwada University, Maharashtra	Integrated MLISc, M.Phil, Ph.D
16	Dravidian University, Andhra Pradesh	Integrated MLISc, MPhil, Ph.D.
17	Gauhati University, Assam	Integrated MLISc, Ph.D
18	Gauhati University, Assam	Integrated MLISc, Ph.D
19	Gujarat University, Gujarat	Integrated MLISc
20	Gulbarga University, Karnataka	Integrated MLISc, M.Phil, Ph.D
21	Guru Nanak Dev University, Punjab	BLISc, MLISc
22	Hemchandracharya North Gujarat University, Gujarat	BLISc, MLISc
23	Jadavpur University, West Bengal	BLISc, MLISc, MLISc in Digital Library, M.Phil, Ph.D
24	Jai Prakash University, Bihar	B.L.I.Sc (3yrs)
25	Jammu University, Jammu & Kashmir	BLISc, MLISc, Ph.D.
26	Jiwaji University, Madhya Pradesh	BLISc, MLISc, Ph.D.
27	Kakatiya University, Telangana	MLISc
28	Kalyani University, West Bengal	Integrated MLISc, Ph.D.
29	Karnataka State Women's University	Certificate course, Integrated MLISc, M.Phil., Ph.D.

30	Karnataka University, Karnataka	Integrated MLISc, M.Phil., Ph.D.
31	Kashmir University, Jammu & Kashmir	Integrated MLISc, M.Phil, Ph.D
32	Kerala University, Kerala	BLISc, MLISc, M.Phil, Ph.D
33	Krishna Kanta Handique State Open University, Assam	DLIS
34	Kurukshetra University, Haryana	BLISc, MLISc, M.Phil., Ph.D.
35	Lucknow University, Uttar Pradesh	Short term courses, BLISc, MLISc, Ph.D.
36	Madras University, Tamil Nadu	Integrated MLISc, Ph.D.
37	Madurai Kamaraj University, Tamil Nadu	Certificate courses, BLISc, MLISc
38	Maharaja Krishnakumarsinji Bhavnagar University, Gujarat	BLISc, MLISc, Ph.D
39	Maharaja Sayajirao University of Baroda, Gujarat	BLISc, MLISc, Ph.D
40	Maharishi Dayanand Saraswati University, Rajasthan	Diploma in Lib Sc, Diploma in Lib & Inf. Sc, Bachelor of Lib sc., M.L.I.Sc. MPhil
41	Mahatma Gandhi Chitrakoot Gramoday Vishwavidyalaya, Madhya Pradesh	BLISc, MLISc, Ph.D
42	Mahatma Gandhi Kashi Vidyapeeth, Uttar Pradesh	BLISc
43	Makhanlal Chaturvedi National University of Journalism and Communication, Madhya Pradesh	BLISc
44	Mangalore University, Karnataka	Integrated MLISc, Ph.D
45	Mohan Lal Sukhadia University, Rajasthan	BLISc, MLISc
46	Mumbai University, Maharashtra	BLISc, MLISc, Ph.D.
47	Mysore University, Karnataka	Integrated MLISc, M.Phil, Ph.D
48	Nalanda Open University, Bihar	Certificate course, BLISc, MLISc
49	North Maharashtra University, Maharashtra	Integrated MLISc
50	Osmania University, Telangana	BLISc, MLISc, PGDDIM
51	Punjabi University, Punjab	BLISc, MLISc
52	Rabindra Bharati University, West Bengal	BLISc, MLISc
53	Rani Durgavati Vishwavidyalaya, Madhya Pradesh	BLISc, MLISc
54	Rani Durgavati Vishwavidyalaya, Madhya Pradesh	BLISc, MLISc
55	Sambalpur University, Orissa	PGDLAN, MLISc, M.Phil, Ph.D.
56	Sampurnanand Sanskrit Vishwavidyalaya, Uttar Pradesh	BLISc
57	Sant Gadge Baba Amravati University,	Certificate courses, BLISc, MLISc

58	Sardar Patel University, Gujarat	BLISc, MLISc, M.Phil, Ph.D
59	Saurashtra University, Gujarat	BLISc, MLISc, Ph.D.
60	Savitribai Phule Pune University, Maharashtra	Integrated MLISc, M.Phil, Ph.D
61	Shivaji University, Maharashtra	BLISc, MLISc, Ph.D.
62	Smt. Nathibai Damodar Thackersey Women's University, Maharashtra	Integrated MLISc, Ph.D
63	Sri Krishnadevaraya University, Andhra Pradesh	Integrated MLISc, MPhil, Ph.D
64	Sri Krishnadevaraya University, Andhra Pradesh	Integrated MLISc, M.Phil, Ph.D
65	Sri Venkateswara University, Andhra Pradesh	Integrated MLISc, MPhil, Ph.D
66	Sri Venkateswara University, Andhra Pradesh	Integrated MLISc, M.Phil, Ph.D
67	The Rashtrasant Tukadoji Maharaj Nagpur University, Maharashtra	Certificate courses, BLISc, Integrated MLISc
68	Tilka Manjhi Bhagalpur University, Bihar	BLISc, MLISc, Ph.D.
69	University of Rajasthan, Rajasthan	BLISc, MLISc, Ph.D
70	Utkal University, Orissa	Integrated MLISc, Ph.D
71	Vardhman Mahaveer Open University, Kota	BLISc, MLISc, Ph.D.
72	Veer Narmad South Gujarat University, Gujarat	BLISc, MLISc
73	Vidya Sagar University, West Bengal	BLISc, MLISc, Ph.D
74	Vikram University, Madhya Pradesh	BLISc, MLISc, M.Phil, Ph.D
<u>Private Universities/ Institutions</u>		
S. No.	Name of University/Institution	LIS Courses offered
1	Adesh University, Punjab	DLISc, BLISc., MLISc
2	Amity University, Uttar Pradesh	BLISc
3	Arunachal University of Studies, Arunachal Pradesh	BLISc., MLISc., Ph.D.
4	Baba Mast Nath University, Haryana	BLISc
5	C.U. Shah University, Gujarat	BLISc., MLISc. MPhil
6	Career Point University, Himachal Pradesh.	BLISc., MLISc
7	Career Point University, Rajasthan.	BLISc., MLISc
8	Desh Bhagat University, Punjab	DLISc, BLISc., MLISc
9	Dr. C.V. Raman University, Chhattisgarh	BLISc., MLISc., Ph.D.
10	G.D. Goenka University, Haryana	BLISc., MLISc
11	Galgotias University, Uttar Pradesh	BLISc., MLISc
12	Guru Kashi University, Punjab	DLISc, BLISc., MLISc, Integrated MLISc

13	Himalayan University, Arunachal Pradesh	DLISc., BLISc., MLISc
14	Institute of Chartered Financial Analysts of India, Tripura	PGDLAN, Integrated MLISc
15	Integral University, Uttar Pradesh	MLISc., Ph.D.
16	Jodhpur National University, Rajasthan	BLISc., MLISc
17	Kalinga University, Chhattisgarh	DLISc., BLISc., MLISc
18	Lovely Professional University, Punjab	BLISc., MLISc
19	Madhav University, Rajasthan	BLISc., MLISc
20	Maharishi Arvind University, Rajasthan	BLISc., MLISc
21	Mangalayatan University, Uttar Pradesh	BLISc., MLISc., Ph.D.
22	Monad University, Uttar Pradesh	DLISc., BLISc MLISc., M.Phil, Ph.D.
23	Navrachana University, Gujarat	BLISc
24	North East Frontier Technical University, Arunachal Pradesh	BLISc., MLISc., MPhil., Ph.D
25	OPJS University, Rajasthan	BLISc., MLISc
26	Pratap University, Rajasthan	DLISc., BLISc.
27	Rayat Bahra University, Punjab	DLISc
28	Sant Baba Bhag Singh University, Punjab	BLISc., Ph.D
29	Shobhit University, Uttar Pradesh	BLISc
30	Singhania University, Rajasthan	BLISc., MLISc
31	Sri Guru Granth Sahib World University, Punjab	BLISc., MLISc., Ph.D.
32	Swami Vivekanand Subharti University, Uttar Pradesh	BLISc., MLISc.
33	Techno Global University, Meghalaya	BLISc., MLISc
34	The Global Open University, Nagaland	BLISc., MLISc
35	University of Science & Technology, Meghalaya	MLISc., Ph.D
36	Venkateshwara Open University, Arunachal Pradesh	Certificate in ICT Application in Library (CICTAL), BLISc., MLISc, PGDLAN
37	Vinayaka Missions Sikkim University, Sikkim	BLISc., MLISc.”

***Source:** LIS Education in India (<https://ilaindia.co.in/lis-education>)

Universities/Institutes offering a Digital Library Component as Part of Library and Information Science (LIS) Courses

S. No.	University/Institute & Website	State	Part of Core/Elective Paper	Course Content on DL
1.	<i>Assam University, Silchar</i> http://www.aus.ac.in	Assam	MLISc Semester-IV Digital Library and Web Technology (Theory)	Theory Unit 1 Digitization Unit 2 Developing Digital Library Unit 3: Institutional Repository Unit 4: Overview of Web Technology Unit 5: Internet and its Connectivity Practical: Part I Creation of Digital Documents with Metadata Part II Creation of Digital Library using any one Digital Library Software
2.	<i>Dr. B. R. Ambedkar University</i> http://www.brau.edu.in/	Andhra Pradesh	MLIS Third Semester (Course 302: Unit-5); (Course 303: Unit 4	Course 302: Unit-5: <ul style="list-style-type: none"> Open-Source Initiatives; Digital preservation and conservation for open access: issues and problems; Course 303: Unit 4: <ul style="list-style-type: none"> Digital & Virtual library- concept & features
3.	<i>Andhra University</i> http://www.andhrauniversity.edu.in	Andhra Pradesh	MLIS Semester III: Paper XII; Unit - V Paper XIII; Unit - IV	<ul style="list-style-type: none"> Digital preservation and Conservation; OAI Digital & Virtual library: Concept & feature
4.	<i>Acharya Nagarjuna University</i>	Andhra Pradesh	MLIS Semester III 304: Digital Libraries	<ul style="list-style-type: none"> Core Paper (Whole units are related to digital libraries)

	https://www.nagarjunauniversity.ac.in/indexanu.html			
5.	Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.) http://www.ggu.ac.in/	Chhattisgarh	MLISc Generic Elective (GE) GE1: Digital Libraries: Fundamentals	Unit- 1 Digital Libraries; Unit- 2 Digital Libraries-Hardware; Unit- 3 Digital Libraries-Software; Unit- 4 Digital preservation; Unit- 5 Preservation, Its Impact on Collection Development
			MLISc Information Technology: Application (Theory)	Unit 5 Digital Libraries <ul style="list-style-type: none"> • Genesis, Definition, Objectives, Scope of Digital Libraries • Study of digital Library Software: Greenstone, D-Space • File Format: Text, Audio, Video and Image • Software and Hardware for Digital libraries: OCR, Image editing software, • Input Capture Devices: Scanners, Digital Movie Cameras Practice: Unit-3 Digital Library Software <ul style="list-style-type: none"> • Overview of Digital Library Software: Greenstone, e-prints • Creation of Digital Repository through D-Space and/or Greenstone
			BLISc Generic Elective – GE2: Digital Library: Fundamentals	Unit– I Digital Libraries Unit– 2 Digitization Process Unit– 3 ICT Application for DLs Unit– 4 Digital Library Architecture
6.	Osmania University, Hyderabad http://www.osmania.ac.in/ArtsCollege/libraryandinformationsscience.htm	Andhra Pradesh	PG Diploma in Digital Information Management” (PGDDIM) (1Year) Semester -1 and Semester -2	Semester – 1 <ul style="list-style-type: none"> • Digital / E-Resources; Digitization process; Development of Digital Libraries & Institutional Repositories; Development of Digital Libraries & Institutional Repositories – Practice Semester – 2 <ul style="list-style-type: none"> • Knowledge Management; Knowledge Organization; Intellectual property Rights; Project Work
7.	University of Delhi, Delhi http://dlis.du.ac.in/	New Delhi	BLIS Semester – I; Unit - II	UNIT – II: Types of Libraries, Professional Associations and Organizations Digital Libraries

			<p>MLIS Semester – I (Unit - III): Multimedia and Institutional Repositories; Semester – II (Unit – II): Integrated Library Management Systems and Institutional Repositories</p>	<p>Semester-I (UNIT – III):</p> <ul style="list-style-type: none"> • Institutional Repositories: Greenstone Digital Library, DSpace, and E-prints, etc. <p>Semester –II (UNIT – II):</p> <ul style="list-style-type: none"> • Installation and Configuration, Hands on Functional Modules of an Integrated Library • Management System (Open Source) Web based Library Management Software • Installation and Configuration, Hands on Collection Building using GLI in Local and Web Library Modes and Metadata Creation • Customization of Greenstone Digital Library Software
8.	<p><i>NISCAIR, New Delhi</i> http://www.niscair.res.in/ <i>Now - NIScPR (National Institute of Science Communication and Policy Research)</i></p>	New Delhi	<p>“Design and Development of Institutional Repositories using DSpace” – Basic & Advance (One Week Course)</p>	<p>DSpace (Basic):</p> <ul style="list-style-type: none"> • Digital Library: Concepts and Software; Metadata: Overview; Linux: An Open-Source Operating System; DSpace Overview; DSpace Installation; Administration: Communities, Collections, Items, Groups, ePeople; Customization & Authorization; Backup & Restore; Metadata Harvesting <p>DSpace (Advance):</p> <ul style="list-style-type: none"> • DSpace Installation; DSpace Customization: Look and Feel; Language; Metadata Input etc.; DSpace Configuration; User Management and Authentication; Migration / Up - gradation from Old Version to New Version; Backup & Restore; Import and Export; Statistical Reports; Metadata Harvesting”
9.	<p>“Indira Gandhi National Open University” http://www.ignou.ac.in/ignou/aboutignou/school/soss/programmes/</p>	New Delhi	<p>BLIE 229: ICT in Libraries</p>	<p>Block 2: Digitisation and Digital Libraries– D-Space and GSDL Unit 5: Introduction to Digital Library Unit 6: Digitisation Process Unit 7: Creating Digital Libraries Using D-Space Unit 8: Creating Digital Libraries Using GSDL</p>

10.	Jamia Milia Islamia University https://www.jmi.ac.in/	New Delhi	MLIS MLS - 105: “Information and Communication Technology (ICT) Applications in Library & Information Science (Theory)”	Unit-3: Digitization & Digital Libraries - Digital Preservation: Need, Purpose, Planning and Issues - Digital Libraries (DL) and Virtual Libraries: Concept, Objectives, Advantages & Limitations - Meta Data: Concept and Types - Digital Libraries Software: Steps of building Digital Libraries using Greenstone Digital Library (GSDL), DSpace & Eprints
11.	Veer Narmad South Gujarat University, Surat http://vnsgulibrary.org/	Gujarat	MLIS Paper-5: Information Technology Application (Theory)	Unit 5: Digital Libraries <ul style="list-style-type: none"> • Genesis, Definition, Objectives, Scope of Digital Libraries • Image formats, Audio formation • Storage media Formats-180-9660 DVD • Software and Hardware for digital libraries, OCR, Image Editing software • Input capture devices, for digital libraries • Data Warehousing, Data Mining and Meta Data
12.	Central University of Gujarat https://www.cug.ac.in/	Gujarat	Post-Graduation Diploma in Digital Library and Information Management (PGDLIM)	<ul style="list-style-type: none"> • Digital Libraries • Library Automation • Information Storage and Retrieval • Web Technology • Information Communication and Technology Basics • Knowledge Organization

			<p>MLISc</p> <p>LIS -502: Digital Libraries (The</p> <p>LIS-541: Digital Libraries (Practical)</p>	<p>Theory</p> <ul style="list-style-type: none"> • Foundations of Digital Libraries; Open Access and Institutional Repositories; Multilingual Digital Repositories • Digitisation: Planning and Implementation, and Best Practices. Preservation of Digital Objects: PREMIS. Digital Rights Management (DRM), Copyright issues • Standards and Protocols for Digital Libraries: Character Encoding Standards, Metadata Standards, Persistent Identifiers & DOI, OAI-PMH • Users and Usage of Digital Libraries: Quantitative and Qualitative Evaluation • “Digital Library Initiatives: National and International; Case studies of digital libraries <p>Practical:</p> <ul style="list-style-type: none"> • Digital Library: Tools and techniques and Software • Digital Preservation and Selection of Materials for Digitization • Open-Source Software for Digital Library Creation <p>Creation of Digital Library using at least one Open-Source Software using open-source software like DSpace, GSDL, Fedora, Eprints, etc.</p>
13.	<p>Saurashtra University</p> <p>http://www.saurashtrauniversity.edu/</p>	Gujarat	<p>BLIS</p> <p>Semester – I; Paper-CCT – 03; (Unit – 3)</p>	<p>Unit -3</p> <ul style="list-style-type: none"> • Relevance of classification in the context of computerized / digital libraries
14.	<p>Hemchandracharya North Gujarat University, Patan</p> <p>http://www.ngu.ac.in/</p>	Gujarat	<p>MLIS</p> <p>Semester – I (Core) Paper – II Information Technology Applications (Theory)</p> <p>Semester – II (Elective Paper – 7)</p>	<p>Semester – I; Paper – II</p> <p>Unit-IV: Digital Libraries</p> <ul style="list-style-type: none"> • Genesis, Definitions, Objectives, Scope of Digital Library • Image Formats and Audio Formats • Storage Media Formats-180-9669-DVD • Software and Hardware for Digital Libraries, OCR, Image Editing Softwares • Input Capture Devices for Digital Libraries • Data Warehousing, Data Mining and Metadata <p>Semester – II</p> <p>Elective Paper – 7: Digital Library</p>

15.	Gujarat University, Ahmedabad <i>http://www.gujaratuniversity.org.in</i>	Gujarat	MLIS LIB 511 EC: Digital Information Management: Theory & Practical	Unit:1 Digital Libraries Unit:2 Content Creation and Security Unit:3 Mark up Languages Unit:4 Digital Library Management Unit:5 Digital Library Software Practical <ul style="list-style-type: none"> Project for Digital Content Creation and Management
16.	Central University of Haryana <i>http://www.cuh.ac.in/departments-of-library-and-information-science.aspx</i>	Haryana	MLISc Digital Libraries (Theory)	UNIT I: Digital Libraries UNIT II: Collection Development UNIT III: Standard and Protocol UNIT IV: User Interface Design and Information Retrieval
17.	Maharshi Dayanand University, Rohtak <i>http://www.mdurohtak.ac.in/</i>	Haryana	MLIS Semester – 3; MLIS – 11 (Unit – 4) & Semester - 4; MLIS – 13 (Unit - 4)	Semester -3; MLIS-11 Unit 4: Digital Libraries <ul style="list-style-type: none"> Digital Library Design and Development of Digital Library Software and Hardware for Digital Libraries – Software Semester-4; MLIS – 13 Unit 4: “Design and Development of Digital Library <ul style="list-style-type: none"> Scanning, Editing Image (Paint/ Photoshop, etc.), OCR, Processing, Metadata Creation, Creating PDF Files (Acrobat Professional) Design and Development of Digital Library Using Greenstone/DSpace
18.	Kurukshetra University, Haryana <i>http://www.kuk.ac.in/</i>	Haryana	MLIS Paper – VI (Unit - V); Paper – V (Unit – II);	Paper-VI Unit – V: Digital Libraries <ul style="list-style-type: none"> Genesis, Definition, Objectives and Scope of Digital Libraries Digitisation and Tools: Techniques of Digitisation, Resolution, Imaging Files and Formats of documents, images, video, audio, etc Metadata: Role of Metadata and Metadata Types

			Paper – VII (Unit – VII)	<p>Paper-V Unit – II</p> <ul style="list-style-type: none"> - Web based Information Sources: E-journals, E-Reference Sources, Subject Gateways, Institutional Repositories, Digital Libraries <p>Paper -VII Unit-IV Digital Library Software</p> <ul style="list-style-type: none"> - Installation, Configuration and working in Greenstone or DSpace
19.	<p>Central University of Himachal Pradesh</p> <p>http://cuhimachal.ac.in/</p>	Himachal Pradesh	<p>M Lib Sc (Integrated Dual Degree Programme)</p> <p>Course Code: LIS - 503</p>	<p>Course Code: LIS - 503</p> <p>Course Name: Digital library (Theory)</p> <p>Unit- I: Digital library basics</p> <p>Unit – II: Digital library collection development</p> <p>Unit – III: Identification, Description and Interoperability standards</p> <p>Unit – IV: Retrieval, Interface and Evaluation</p> <p>Unit -V: Digital preservation and archiving</p>
20.	<p>Karnataka State Women's University</p> <p>http://www.kswu.ac.in/</p>	Karnataka	<p>MLIS</p> <p>Semester -4 (Elective)</p> <p>Paper: ML-4.4: DIGITAL LIBRARIES (Theory)</p> <p>Paper: ML-4.5: DIGITAL LIBRARIES (Practical)</p>	<p>Unit 1: Digital Libraries: Meaning and Definitions, Nature, Objectives, Characteristics, Digital library collections; Architecture, Interoperability, Compatibility, Protocols, standards, Metadata, Searching and Harvesting, and User Interfaces, Usability and use studies, Cross language retrieval, semantic web, multi-lingual and multi scripts issues; Digital library technology</p> <p>Unit 2: Digital Resource Management</p> <p>Unit 3: Multimedia and Multimedia Authoring Tools:</p> <p>Unit 4: Web Technology:</p> <p>Unit 5: Hands on assignments: Installation of Greenstone/DSpace/Eprints. “Building digital collections; Creating Metadata. Searching, Indexing. Modifying user interface etc.”</p>
21.	<p>Gulbarga University, Karnataka</p> <p>http://gulbargauniversity.kar.nic.in/</p>	Karnataka	<p>MLIS</p> <p>Semester -4</p> <p>Hardcore: HC 4.1 Digital Libraries</p>	<p>Unit-1: Digital Libraries</p> <p>Unit-2: Digital Library Design</p> <p>Unit-3: Information Organization, Access User Interface and Retrieval</p> <p>Unit-4: Digital Archiving and Preservation</p>
22.	<p>University of Mysore</p>	Karnataka	MLIS	MLIS

	http://www.uni-mysore.ac.in		<p>Semester-IV Hard Core: Digital Libraries and E-publishing</p> <p>Soft Core: Digital Library Software</p>	<p>Semester-IV Hard Core: Digital Libraries and E-publishing Unit 1: Digital Libraries: Concepts and issues Unit 2: Content creation Unit 3: Creating Web documents Unit 4: Open Access Movement and Institutional repositories. Case study of select digital Libraries and IRs. California Digital Library; Alexandria Digital Library; ArXive; Cogprints; Vidyanidhi. Soft Core: Digital Library Software Unit 1- Installation of Greenstone. Building digital collection using Greenstone Unit 2 - Creating Metadata. Searching, Indexing. Modifying user interface etc. in Greenstone Unit 3 - Installation of DSpace/Eprints. Unit 4 - Building collection to DSpace/Eprints</p>
23.	<p>Documentation Research & Training Centre (DRTC), Bangalore</p> <p>http://drtc.isibang.ac.in/DRTC/mslis</p>	Karnataka	<p>MS in Library and Information Science</p> <p>Semester -II Paper-9: Digital Libraries Paper-20: Semantic Web</p>	<p>Semester -II Paper-9: Digital Libraries</p> <ul style="list-style-type: none"> • Historical Development of Digital Libraries. Copyright and license issues. • Digitization: Software, Hardware and best practices; Scanners and scanner types; Optical character recognition and comparative study of OCR software. • Open Standards and File Formats, Metadata and Metadata Standards • Digital library software: Features and comparative study of DSpace, Eprints and Fedora; Harvesting Metadata, OAI-PMH and DL Interoperability; Harvester software. • Digital Library Architectures; Grid architecture. Open URL integration. Digital Preservation: PREMIS. Persistent identifiers: DOI and CNRI Handles; Multilingual digital repositories and Cross-language information retrieval <p>Paper-20: Semantic Web</p> <ul style="list-style-type: none"> • Beyond traditional authority files: Knowledge organization for digital libraries.
24.	Bangalore University, Bangalore	Karnataka	MLIS	<p>HP: 403: Library Automation and Digital Library Unit 2: Digital Library and Digital Library Software</p>

	http://bangaloreuniversity.ac.in/		Paper - HP: 403: Library Automation and Digital Library Paper - HC-P: 404 Information Technology (Practical)	<ul style="list-style-type: none"> Digital Libraries: Concept, Definition, Objectives and Characteristics; DL initiatives in India. Features of any one Digital Library Software – DSpace, GSDL Unit 3: Digitization and Digital Preservation <ul style="list-style-type: none"> Digitization – Planning and implementation, Digital preservation - Scanners and its types; OCR and IPR issues HC-P: 404 Information Technology (Practical) <ul style="list-style-type: none"> Digital library software: DSpace; GSDL
25.	Jiwaji University, Madhya Pradesh http://www.jiwaji.edu/	Madhya Pradesh	BLIS Course Code: BLIS – 203 B (Unit –V)	Course Code: BLIS – 203 B Unit- V: Preservation of Non-Print Materials <ul style="list-style-type: none"> Digitization and Digital Preservation Digitization Project: Project Proposal, Budget personnel, Funding Project plan and Output.
			MLIS Course Code: MLIS – 101 Unit – IV & V	Course Code: MLIS – 101 Unit – IV: Digitization and Library Automation <ul style="list-style-type: none"> Digitization: Concepts and Needs Steps of Digitization and Software Planning of Implementation Open-Source Software Course Code: MLIS – 103 Unit – V: Searching on Consortia’s and Repositories <ul style="list-style-type: none"> J-gate and INDEST
26.	Devi Ahilya Vishwavidyala http://www.dauniv.ac.in/	Madhya Pradesh	BLIS Semester – II (Core) Unit – 4: Digital libraries	Semester – II Unit - 4: <ul style="list-style-type: none"> Digital libraries: Growth and development need and importance. Organisation of digital libraries. Infrastructure of digital libraries and digital library management. Internet resources for libraries and surfing on internet.
			MLIS Semester – II Course No.607; Unit - 4	Semester – II Course No.607: Information Technology: Applications (Theory) Unit - 4

			Digital libraries	<ul style="list-style-type: none"> Digital libraries: Genesis, definition, objectives, scope of digital libraries. Software for digital libraries. OCR. DOI. Image editing software. Hardware for digital libraries: Input capture devices, scanners, digital, movie cameras. Image formats, audio Formation. Web 2.0 and Library 2.0. Emerging technologies.
27.	Dr. Harisingh Gour University, Madhya Pradesh <i>http://rcss.rajagiri.edu/course/RSLI</i>	Madhya Pradesh	BLIS Semester – I; Unit - III	BLIS Semester -I Unit-III Networking and Digital Library <ul style="list-style-type: none"> Definition, types of networks: LAN, WAN, MAN. Networking: Concepts and topologies. Digital Libraries: Introduction
			MLIS Semester – II; Unit – II	MLIS Semester –II Unit – II: Electronic Media and Publishing <ul style="list-style-type: none"> Digital data description: Metadata Data warehouse and data mining Digital library initiatives
28.	TATA Institute of Social Sciences <i>http://www.sgbau.ac.in/</i>	Maharashtra	MLIS Semester – III; Course Code – LIS 13	Course Code – LIS 13 Digital Libraries (Theory and Practice)
			PG Diploma in Digital Library and Information Management	DL – 01: Knowledge Society DL - 02: Foundations of Digital Libraries DL – 03: Collections Development in Digital Libraries DL – 04: Information Management DL – 05: Digital Library Architecture DL – 06: Information Access & Services DL – 07: Digital Preservation and Achieving DL – 08: Field Work

29.	Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur http://www.nagpuruniversity.org	Maharashtra	MLIS Semester - IV Paper - IV – 23: Digital Libraries (Elective) & Practice: P13	Unit I: Digital Libraries: Definitions, Concept Objectives and Scope Unit II: Organization of Digital Libraries Unit III: Building Digital Libraries: Unit IV: Digital Library Initiatives Unit V: Intellectual Property Rights (IPR): IPR issues in Digitization Practice: P13 Information Technology Applications (Part II) <ul style="list-style-type: none"> • Hands on Experience on any Digital Library Software • Scanning and digitizing documents
30.	Dr. Babasaheb Ambedkar Marathwada University, Aurangabad http://www.bamu.ac.in/department/libsci/	Maharashtra	MLIS Semester –III; Unit -3: Digital Libraries	Unit 3. Digital Libraries <ul style="list-style-type: none"> • Genesis, Definition, Objectives, Scope of Digital Libraries • Image formats, Audio formation • Storage media formats – ISO-9660, DVD • Software and Hardware for Digital Libraries, OCR, Image Editing Software • Input capture devices, Scanners, Digital Movie Cameras • Data Warehousing, Data Mining and Metadata
31.	North Eastern Hill University (NEHU) http://www.nehu.ac.in/	Meghalaya	MLIS Semester-IV; LIS-C 402: Digital Library	<ul style="list-style-type: none"> • Credit -1: Definitions and Concepts: Digital Libraries and Institutional Repositories • Credit -2: Legal Issues: Intellectual Property Rights, Copyrights in Digital Environments and Exceptions for Libraries; Digitization: Process, Purpose Localization, Selection Criteria and Prioritization. • Credit -3: Digital Formats: Textual and Non-textual; Character Encoding: Issues, Schemes and Standard; Mark-up • Credit 4: Infrastructural Requirements
32.	Mizoram University http://www.mzu.edu.in	Mizoram	MLIS Fourth Semester: Course Code: LIS/3/CC/14: ICT Practice;	Course Code: LIS/3/CC/14: ICT PRACTICE Unit 3: Hands-on experience on Library Software: Digital Library Software: DSpace / Greenstone Course Code: LIS/4/CC/22: Content Management & Digital Library – Theory & Practice

			Course Code: LIS/4/CC/22: Content Management & Digital Library – Theory & Practice	(Theory) Unit 1: Content Management & Digitization Unit 2: Digital Library Creation (Practice) Unit 3: Content Management & Digitization Practice Unit 4: Digital Library Practice
			M.Phil. MPLIS-02: Digitization	<ul style="list-style-type: none"> • Digitization: Need, Methods and Equipment's • Digital Library: Components, Digital Library Initiatives in India, Open Access Initiative • Library Website: Design and Maintenance • Content Development: Concept, Scope, Content Organization, Content Analysis, Web Based Content Development, HTML, XML, PDF, Acrobat • Legal Issues: Copy right and Intellectual Property Rights in Electronic Environment
33.	Manipur University, Imphal https://www.manipuruniv.ac.in/department/library-info-sc-department	Manipur	MLISc MLIS-303 ICT Application in LIS (Theory)	<ul style="list-style-type: none"> • MLIS-303 ICT Application in LIS (Theory)
34.	Sambalpur University, Orissa http://www.suniv.ac.in/	Orissa	BLIS Paper – VIII: UNIT-II : Different library systems, their salient features and functions	Paper – VIII: UNIT-II <ul style="list-style-type: none"> • Public Library System; Academic Library System; Special Library System and Digital Libraries
35.	Pondicherry University, Pondicherry http://www.pondiuni.edu.in/	Pondicherry	MLIS Course - 3.4: Information Technology: Practice	Course - 3.4: Information Technology: Practice Hands-on experience with the following Softwares: Digital Library Softwares: Greenstone, DSpace and E-Prints. Course 4.2: Digital Libraries Unit 1: Digital Libraries

			Course 4.2: Digital Libraries	Unit 2: Design and Organisation of Digital Libraries Unit 3: Digital content creation Unit 4: Digital Resources Management Unit 5: Digital Libraries Technology
36.	Punjabi University, Patiala <i>http://www.punjabiuniversity.ac.in/</i>	Punjab	MLIS Paper-VIII: Information and Communication Technology: Applications	Paper – VIII; Section-A. <ul style="list-style-type: none"> Digital Library Software, Features: e- Granthalyas, DSpace and Greenstone.
37.	Punjab University, Chandigarh <i>http://pucho.ac.in/syllabus.php</i>	Punjab	MLIS Paper Code: M. Lib. 10 Unit – IV Digital Libraries and WSDS:	Paper Code: M. Lib. 10 Unit – IV Digital Libraries and WSDS: Digital Libraries (DL): Concept, Objectives and Advantages. Concept of Virtual Libraries. DL Initiatives: Features of Traditional Knowledge Digital Library (TKDL) and World Digital Library (WDL). Role of Scanning and OCR in Digitization. DL Software: Steps of building DL using Greenstone Digital Library (GSDL). Digital Divide: Concept. IFLA/UNESCO Manifesto for Digital Libraries. Federated Searching: Concept and Features. Web-Scale Discovery System (WSDS): Concept, Features, Advantages of WSDS over Federated Searching.
			PGDLAN (Post Graduate Diploma in Library Automation and Networking) (Paper Code: LAN-05 & LAN –06)	Paper Code: LAN-05 Paper Title: Digital Library and Content Management Unit-I : Digital Library Unit-II : Digital Library Software and Metadata: Unit-III : Content Analysis and Organisation Paper Code - LAN -06 Paper Title: Computer Practical-2 Unit – II: Digital Library: Building Digital Library using Greenstone Digital Library Software (GSDL): a step-by-step approach including Metadata creation.

38.	<p>Central University of Punjab</p> <p>http://cup.edu.in/dept_libsci_infsci.php</p>	Punjab	<p>LIS.553 & LIS.555: Library Automation and Digital Library</p>	<p>Library Automation and Digital Library: LIS.553 Unit – III: Digital Library 16 hours</p> <ul style="list-style-type: none"> • Digitization – Planning, Selection of Materials, Hardware, Software, Process, Issues. • Digital Library: Genesis, Characteristics, Types, Architecture; Standards, Formats and Protocols, DOI. • Digital Preservation - Need, Purpose, Standards, Methods, Techniques, Projects (National and International). • Digital Library Initiatives – National and International. <p>LIS.555: II. Digital Library Software</p> <ul style="list-style-type: none"> • D-Space • E-Prints • Greenstone
39.	<p>Mohanlal Sukhadia University, Udaipur</p> <p>http://www.dpsmlsu.org/</p>	Rajasthan	<p>BLIS</p> <p>Paper-V Unit-IV: Digital Libraries</p>	<p>Paper-V Unit-IV: Digital Libraries</p> <ul style="list-style-type: none"> • Genesis, Definition, Objectives, Scope • Characteristics and Nature of Collection of Digital Library • Information Organization– Classification Indexing. • Bar Code Technology & Tools.
40.	<p>Vardhman Mahaveer Open University, Kota</p> <p>www.vmou.ac.in/</p>	Rajasthan	<p>MLIS (Hindi medium) Paper – 07</p>	<p>Paper – MLIS 07 Unit- 9: Digital Libraries: Basic Elements, Components and Services Unit-10: Digital Libraries: Technical Fundamental Architecture testing and I.P.R. issues.</p>
			<p>CPDL (Certificate Program on Digital Libraries) (6 Month Course)</p>	<p>CPDL 1: Introduction to Digital Libraries Block 1: Foundation of Digital Libraries Block 2: DL Planning and Management Block 3: Issues and Challenges in Digital Libraries CPDL 2: Creation and Management of Digital Objects</p>

				<p>Block 1: Digitization Tools and Processes Block 2: Digital Resource Description Block 3: Practicum CPDL 3: Design and Development of DLs Block 1: Design Issues Block 2: DL Software Block 3: Practicum</p>
41.	<p>University of Rajasthan, Jaipur http://www.uniraj.ac.in/</p>		<p>MLIS MLS-103: ICT Application in Library and Information Science (Theory) Unit – VI</p>	<p>Unit-VI Digital Libraries: Concepts, Objective and Advantages, Indian Initiatives. Features of TKDL. DL Software: Basic feature of ABCD Software, Metadata Definition, Dublin Core Metadata Elements Sets (DCMES)</p>
42.	<p>Bharathiar University, Tamil Nadu http://buc.edu.in/departments/</p>	Tamil Nadu	<p>MLIS Core Paper - CORE - XIV MLISC14 Digital Libraries</p>	<p>Unit- I: Concept of Digital Libraries Unit – II: Digital Library Management Unit – III: Digital Resources Unit – IV: Overview of Major Digital Library Initiatives Unit –V: Building the digital library</p>
			<p>M.Phil/ Ph.D. Paper -2 & Paper -3 (Special Paper)</p>	<p>Paper -2 Unit IV– Digital Library : Digital Library Initiatives - Digitization – Digital Library Development – Issues Involved – Electronic Resources – Access to Web Based Digital Resources – Electronic Publishing, E-mail and CD ROM Technology. Strategic Management of Digital Libraries – Challenges for Digital Library – Intellectual Property Rights in Digital environment Paper -3 (Special Paper) <ul style="list-style-type: none"> • Introduction to Digital Libraries </p>

43.	Alagappa University, Tamil Nadu <i>http://alagappauniversity.ac.in/</i>	Tamil Nadu	MLIS Paper -5 (Unit –IV)	Paper -5 (Unit –IV) Human Resources and staff formula – Standards for University/College Libraries – Automation in academic libraries in India – Impact of information technology on academic library services – Electronic library, Digital library, virtual library.
44.	Central University of Tamil Nadu <i>https://cutn.ac.in/library-science/</i>	Tamil Nadu	MLISc Core Paper: LIS/3/CC/15 Digital Library and Content Management Systems (T)	Unit 1: Digital Library Concepts Unit 2: Digital library software and Digital preservation Unit 3: Introduction to CMS Unit 4: Creating and managing Websites
45.	Kakatiya University, Warangal <i>http://kakatiya.ac.in/courses</i>	Telangana	MLIS Semester – I & Semester - II	Semester – I Blok -IV 4.2.: Digital Libraries: Concept Software’s: Greenstone & DSpace – Digitization projects Semester -II Block-II 2.4 Modernization of special libraries with special reference to India • Digital Libraries – Concept, Purpose and Functions
46.	Banaras Hindu University (BHU) <i>http://www.bhu.ac.in/</i>	Uttar Pradesh	MLIS Semester – I & Semester - 2	Semester-I Paper -1 Unit 5: Digital Libraries • Concept of Digital, Virtual Library • Characteristics of Digital Libraries & their collections • Role of Library Professionals in Electronic Environment Semester-II Paper-VII Unit 4: Internet Sources • Internet Services & Facilities

				<ul style="list-style-type: none"> Internet Sites & Sources – Subject Gateways, Digital Libraries, Forums, Bulletin Board etc.
47.	<p>Aligarh Muslim University, Aligarh</p> <p>http://www.amu.ac.in/</p>	Uttar Pradesh	<p>BLIS Paper-II (BLS-8002) Unit-II</p>	<p>Paper-II (BLS-8002) Unit-II</p> <ul style="list-style-type: none"> Digital Library: Definition, Purpose, Scope Meta Data Concept and Types
			<p>MLIS Paper -VI MLS-8013 Unit-II & Paper-VII MLS-8014</p>	<p>MLIS: Paper –VI; MLS-8013 Unit-II</p> <ul style="list-style-type: none"> Digital Libraries: Genesis, definition, objectives, scope Image formats, Audio formation Storage Media, Standards and Formats – ISO-9660, DVD, Blue ray Software and Hardware for digital libraries, OCR, Image Editing Software Open source softwares Input capture devices <ul style="list-style-type: none"> scanners, digital & movie cameras Data warehousing, Data Mining, Meta Data, Dublin Core, Digital Object Identifier (DOI) <p>Paper-VII MLS-8014</p> <ul style="list-style-type: none"> Development of Digital Library using Green Stone Digital Library Software (GSDL)
48.	<p>Babasaheb Bhimrao Ambedkar University, Lucknow</p> <p>https://www.bbau.ac.in/DeptLibScience.aspx</p>	Uttar Pradesh	<p>MLISc 802: Information Technology: Applications</p>	<p>Unit-4</p> <ul style="list-style-type: none"> Digitization Planning, Selection of Materials, Hardware, Software, Process, Issues Digital Preservation, Need, Purpose, Standards, Methods, Techniques, Projects (National and International). Digital Library Initiatives National and International. Teleconferencing, and Video conferencing Disaster management in Digital Environment <p>Unit-5</p>

				<ul style="list-style-type: none"> Digital Library: Genesis, Characteristics, Types and Architecture Metadata Hardware and software Input capture devices, scanners, digital, movie cameras Planning procedure and implementation
49.	Netaji Subhas Open University, Kolkata http://wbnsou.ac.in/	West Bengal	MLIS Elective Course: E1	Elective Course: E1 - Preservation and Conservation of Library Material Module - 3: - Digital Preservation
50.	Jadavpur University http://www.jaduniv.edu.in/	West Bengal	MLIS in Digital Libraries	<ul style="list-style-type: none"> Digital Libraries (detail not given on website)
51.	University of Calcutta, Kolkata http://www.caluniv.ac.in/academic/library.htm	West Bengal	MLIS (5 years Integrated Course) Semester -9 & 10	Semester – 09 <ul style="list-style-type: none"> 901 Digital Library and Related Concepts Semester - 10 1001L Digital Library Management (Practice)
52.	The University of Burdwan http://www.buruniv.ac.in	West Bengal	MLIS Semester- IV Paper Code: LS-CC-402: Digital Library System	Unit 1: Historical and Theoretical Foundations Unit 2: Organization of Digital Objects Unit 3: Architecture, Information Retrieval and User interfaces Unit 4: Design and Development of Digital Library Systems Unit 5: Federated and Multilingual Digital Library Systems Unit 6: Practical Components

Annexure - 4.3

LIS Continuing Professional Education (CPE) Programmes on Digital Libraries in India

(During April 2003 – December 2020)

S. No.	Name of Programme	Type	Date	Year	Duration	Host Institution	Place	State
1.	Awareness programme on Greenstone Digital Library Software (GSDL)	Short Term Training Programme	26-Apr	2003	1 Day	NCSI-NET Alumni Association, Bangalore, Karnataka	National Centre for Science Information (NCSI), Indian Institute of Science, Bangalore, Karnataka	Karnataka
2.	Workshop on Developing Digital Libraries using Greenstone Digital Library Software (GSDL)	Workshop	2-6 May	2003	5 Days	NCSI - National Centre for Science Information, Indian Institute of Science, Bangalore, Karnataka	NCSI, Indian Institute of Science, Bangalore, Karnataka	Karnataka
3.	Workshop on Building Digital Libraries using Greenstone Digital Library Software	Workshop	30 Nov. - 1 Dec.	2003	2 Days	Bioinformatics Centre, University of Pune, Maharashtra	Bioinformatics Centre, University of Pune, Maharashtra	Maharashtra
4.	Digital Libraries Program	Short Term Training Programme	19-21 Jan.	2004	3 Days	IIM Kozhikode, Kerala	IIM Kozhikode, Kerala	Kerala
5.	4th ASSIST National Seminar on "Digital Resources and Services in Libraries	Seminar	12-13 April	2004	2 Days	Kuvempu University, Shimoga, Karnataka	Kuvempu University, Shimoga, Karnataka	Karnataka
6.	Seminar on Digital Libraries	Seminar	8-Mar	2004	1 Day	DRTC, Bangalore, Indian Statistical Institute & Max Mueller Bhavan (Goethe Institute), Bangalore	DRTC, ISI, 8th Mile, Mysore Road, Bangalore	Karnataka

7.	Workshop on developing a digital library using DSpace	Workshop	28 June - 3 July	2004	6 Days	Dept of Library & Information Science, Osmania University in collaboration with INFLIBNET	Dept. of Library & Information Science, Osmania University Main Rd, Hyderabad, Telangana	Telangana
8.	National Workshop on Developing Digital Library using DSpace	Workshop	9-13 May	2005	5 Days	University Library Mahatma Gandhi University Kottayam, Kerala in collaboration with INFLIBNET Centre (UGC), Ahmedabad	Mahatma Gandhi University Library, Priyadarshini, Kottayam, Kerala	Kerala
9.	National workshop on Building Digital Library	Workshop	17-18 Jun	2005	2 Days	Learning resource Centre, Jaypee Institute of Information, Noida, U.P.	Jaypee institute of Information Technology (Deemed university), Noida, U.P.	Utter Pradesh
10.	Digital Libraries Program	Short Term Training Programme	14-16 July	2005	3 Days	IIM Kozhikode, Kerala	IIM Kozhikode, Kerala	Kerala
11.	Workshop on Digital Libraries	Workshop	6-8 April	2006	3 Days	Mylisa (Mysore Librarians and Information Scientists Association) in collaboration with SDM-IMD (SDM Institute for Management Development, Mysore. Karnataka	SDM-IMD campus, Mysore. Karnataka	Karnataka
12.	Workshop on Design and Development of Digital Libraries	Workshop	9-13 Oct.	2006	5 Days	Department of Library and Information Science, Andhra University, Visakhapatnam. Andhra Pradesh	Department of Library and Information Science, Andhra University, Visakhapatnam. Andhra Pradesh	Andhra Pradesh
13.	ISIM-NIFT Training Workshop on Digital Libraries	Workshop	31 July - 5 Aug.	2006	6 Days	The International School of Information Management (ISIM), University of Mysore, Mysore	The International School of Information Management	Karnataka

							(ISIM), University of Mysore, Mysore	
14.	Workshop on Open-Source Movement and the Use of DSpace Software	Workshop	28 Nov. - 1 Dec.	2006	3 Days	Indian Association of Special Libraries & Information Centres (IASLIC), Kolkata	National Institute for the Orthopedically Handicapped (NIOH), Bonhooghly, Kolkata	West Bengal
15.	Workshop on Building Digital Libraries using DSpace and GSDL	Workshop	27-28 Oct.	2006	2 Days	Society for the Advancement of Library and Information Science Science (SALIS Chennai Chapter) & The Central Library of B.S. Abdur Rahman Crescent Engineering College, Chennai	Thiagarajar School of Management, Madurai, Tamil Nadu	Tamil Nadu
16.	Workshop on Digital Libraries	Workshop	31 Oct. - 3 Nov.	2006	4 Days	TERI, IHC Complex, Lodhi Road, New Delhi.	TERI, IHC Complex, Lodhi Road, New Delhi.	Delhi
17.	ICDL 2006 - International Conference on Digital Libraries	Conference	5-8 Dec.	2006	4 Days	TERI (TIFP, Department of Scientific and Industrial Research, Ministry of Science and Technology, Govt. of India and UNESCO and in cooperation with ACM SIGCHI)	TERI, The India Habitat Centre, New Delhi.	Delhi
18.	One-Day Tutorial on Building Digital Library using GSDL and DSpace	Workshop	11 Dec.	2006	1 Day	Central Library & Computer Vision & Pattern Recognition Unit (CVPR) Indian Statistical Institute	Indian Statistical Institute, 203 B.T. Road, Kolkata	West Bengal
19.	Regional Workshop on Greenstone Digital Library Software	Workshop	8-10 Feb.	2007	3 Days	Department of Library Services Christian Medical College Vellore & Madras Library Association, Chennai	CHTC Auditorium, Christian, Medical College, Bagayam,. Vellore, Tamilnadu	Tamil Nadu

20.	Workshop on Digital Library Initiatives using GSDL & DSpace	Workshop	16-17 March	2007	2 Days	Society for the Advancement of Library and Information Science (SALIS Chennai Chapter) & The Central Library of B.S.Abdur Rahman Crescent Engineering College, Chennai	The Central Library of B.S.Abdur Rahman Crescent Engineering College, Chennai, Tamil Nadu	Tamil Nadu
21.	EMPI Digital Library National Convention 2007 (EMPIDLNC2007)	Conference	18-20 March	2007	3 Days	Knowledge & Learning Resource Centre EMPI Business School CSKM Educational Complex Satbari, Chattarpur New Delhi	India International Centre, 40, Max Mueller Marg, New Delhi	Delhi
22.	The Workshop on Digital Libraries	Workshop	10-13 April	2007	4 Days	TERI, IHC Complex, Lodhi Road, New Delhi and DSIR (Department of Scientific and Industrial Research), Government of India	TERI, IHC Complex, Lodhi Road, New Delhi	Delhi
23.	Workshop on Digital Libraries	Workshop	1-3 Jun	2007	3 Days	Indian Library Association (ILA) with Collaboration of BIMTECH, Greater Noida	BIMTECH, Greater Noida, U.P.	Utter Pradesh
24.	Workshop on "Digitization of Resources using Open-Source Software: GSDL"	Workshop	23-25 Sep.	2007	3 Days	IIM-Lucknow Campus in collaboration with NASSDOC, New Delhi	IIM-Lucknow Campus	Utter Pradesh
25.	National Workshop on "Open Access Repositories and Greenstone software"	Workshop	6-8 Nov.	2007	3 Days	Department of Library & Information Science, The University of Kashmir.	Department of Library & Information Science, The University of Kashmir, Srinagar, Jammu and Kashmir	Jammu & Kashmir
26.	DSIR-NCSI Advanced Workshop on Greenstone Digital Library Software (GSDL)	Workshop	26-28 Dec.	2007	3 Days	Department of Scientific and Industrial Research (DSIR) & NCSI, IISc, Bangalore	NCSI, IISc, Bangalore	Karnataka

27.	Workshop on Building Digital Archive using Advanced Features of GSDL	Workshop	8-10 Jan.	2008	3 Days	TERI, New Delhi	India Habitat Centre, New Delhi	Delhi
28.	National Workshop on "Building Digital Libraries Using GSDL and DSpace	Workshop	14-15 March	2008	2 Days	Institute of Health Management Research in association with SALIS -Delhi NCR	Institute of health Management Research, Sanganer Airport, Jaipur, Rajasthan.	Rajasthan
29.	National Workshop on "Open Access Repositories and Greenstone software"	Workshop	17-19 March	2008	3 Days	The Department of Library & Information Science, The University of Kashmir, Hazratbal Srinagar	The Department of Library & Information Science, The University of Kashmir, Srinagar, Jammu and Kashmir	Jammu & Kashmir
30.	Regional Training & Workshop on Building of Institutional Archives & Digital Libraries	Workshop	24-27 Jun	2008	4 Days	Indian Statistical Institute (ISI) & Sikkim-Manipal Institute of Technology (SMIT), Majitar, Sikkim	SMIT Campus, Majitar, Sikkim	Sikkim
31.	International Workshop on UNESCO's WINISIS/genesis For Digital Libraries/Archives	Workshop	6-9 Sept.	2008	4 Days	Mahatma Gandhi University Library, Idukki, Kerala	Marian College, Kuttikkanam, Peermade, Idukki, Kerala	Kerala
32.	Workshop on developing digital library using DSpace (a program under Teqip -world bank	Workshop	27-29 Aug.	2008	3 Days	The M.S.Ramaiah Institute of Technology, Library & Information Centre, Bangalore, Karnataka	Hi-Tech Seminar Hall MSRIT, Bangalore, Karnataka	Karnataka
33.	Workshop on "Digital Libraries for Academic Institutions using GSDL	Workshop	4 Oct.	2008	1 Day	National Engineering College, Kovilpatti (TN) and SALIS (Tirunelveli chapter)	National Engineering College, Kovilpatti, Tamilnadu	Tamil Nadu
34.	National Workshop on "DSpace for Building Institutional Repositories and Digital Libraries"	Workshop	21-25 Oct.	2008	5 Days	Mahatma Gandhi University, Kottayam, Kerala and Federal Institute of Science and	Mahatma Gandhi University, Kottayam, Kerala and Federal Institute	Kerala

						Technology (FISAT), Angamaly Kerala	of Science and Technology (FISAT), Angamaly Kerala	
35.	International Workshop on Greenstone Digital Library Software	Workshop	8-13 Dec.	2008	6 Days	IIM Kozhikode, Kerala	IIM Kozhikode, Kozhikode, Kerala	Kerala
36.	Workshop on Digital Preservation in India	Workshop	7 Nov.	2008	1 Day	FICCI, Federation House, Tansen Marg, New Delhi	FICCI, Federation House, Tansen Marg, New Delhi	Delhi
37.	Workshop on Digitization and Digital Library using DSpace	Workshop	3-6 Dec.	2008	4 Days	Librarians Cultural Forum in collaboration with Delhi University Library System University of Delhi, Delhi	Central Library Delhi University Library System, Delhi	Delhi
38.	National Conference on Digitization and Digital Preservation (NCDDP-2008)	Conference	11-12 Dec.	2008	2 Days	DESIDOC, Delhi	DESIDOC, DRDO Metcalfe House, Delhi	Delhi
39.	National Seminar on "Digitization and Networking of Library and Information Centers in NE India"	Seminar	9-10 Jan.	2009	2 Days	Department of Library and Information Science, Gauhati University, Guwahati (Assam) & Central Reference Library, Department of Culture, GOI, Kolkata	Gauhati University, Jalukbari, Guwahati	Assam
40.	National workshop on Digital Libraries and Digital Archiving	Workshop	26-29 Aug.	2009	4 Days	Department of Library and Information Science, University of Kerala	Department of Library and Information Science, University of Kerala	Kerala
41.	Workshop on Future Libraries: Advanced GSDL and RFID	Workshop	14-16 Jan.	2009	3 Days	TERI, New Delhi	India Habitat Centre, New Delhi	Delhi
42.	NCSI-IDRC Workshop on Library Automation Packages and Digital Library Software	Workshop	27-31 July & 3-7 Aug.	2009	10 Days	National Centre for Science Information (NCSI), Indian Institute of Science (IISC), Bangalore, Karnataka	National Centre for Science Information (NCSI), Indian Institute of Science (IISC), Bangalore, Karnataka	Karnataka

43.	International Conference on Digital Libraries (ICDL 2010)	Conference	23-26 Feb	2010	4 Days	TERI, New Delhi	TERI, New Delhi	Delhi
44.	Five Days National Level Workshop on Library Automation and Building Digital Library Using KOHA and DSpace Open-Source Software	Workshop	18-22 Feb.	2010	5 Days	MAEER'S Maharashtra Academy of Engineering, Alandi, Pune, Maharashtra	MAEER'S Maharashtra Academy of Engineering, Alandi, Pune, Maharashtra	Maharashtra
45.	SALIS Seminar on Emerging Technologies in Digital Libraries and e-Learning	Seminar	13-Mar	2010	1 Day	K.L.N. College of Information Technology, Pottapalayam, Madurai & Society for the Advancement of Library and Information Science (SALIS), Madurai chapter	K.L.N. College of Information Technology Pottapalayam, Sivagangai, Tamilnadu	Tamil Nadu
46.	National conference on next generation digital libraries and Web technologies: challenges and opportunities (SALIS - 2010)	Conference	20-21 Aug.	2010	2 Days	Central Library Sri Krishna College of Engineering and Technology Coimbatore & Society for the Advancement of Library and Information Science	Sri Krishna College of Engineering and Technology, Coimbatore, Tamilnadu	Tamil Nadu
47.	National Seminar on "Total Quality Management in Digital Libraries"	Seminar	11 Oct.	2010	1 Day	Thiagarajar School of management (TSM), Madurai & SALIS Madurai Chapter	Thiagarajar school of Management, Center for higher learning, Pamban swamy Nagar, Thirupparankundram, Madurai	Tamil Nadu
48.	Seminar on Different Interfaces of Digital Library: An Exploratory Study	Seminar	12 Nov.	2010	1 Day	Indian Statistical Institute Documentation Research and Training Centre, 8th Mile Mysore Road, Bangalore	DRTC, Bangalore	Karnataka

49.	Seminar on Knowledge Representation and Digital Libraries (includes Workshop on advanced DSpace)	Seminar	17-18 Feb	2011	2 Days	Indian Statistical Institute Documentation Research & Training Centre, Bangalore	DRTC, Bangalore	Karnataka
50.	The International Conference on Digital Library Management: ICDLM 2011	Conference	11-13 Jan.	2011	3 Days	TERI, New Delhi	Science City, Kolkata, Co-Organizer: Raja Rammohun Roy Library Foundation, Ministry of Culture, Government of India, Kolkata	West Bengal
51.	National Workshop on 'Digital Objects and Metadata: Preservation, Harvesting and Migration'. IGIDR, Mumbai	Workshop	17-20 Jan.	2011	4 Days	Indira Gandhi Institute of Development Research, Film City Road, Santosh Nagar, Gen Vaidya Marg, Goregaon (East), Mumbai, Maharashtra	Indira Gandhi Institute of Development Research, Film City Road, Santosh Nagar, Gen Vaidya Marg, Goregaon (East), Mumbai, Maharashtra	Maharashtra
52.	National Seminar on "Digital Future of Library Materials: Issues and Challenges"	Seminar	17-18 March	2011	2 Days	Department of Library and Information Science, Vidyasagar University, Medinipur, West Bengal	B C Mukherjee Hall, Vidyasagar University Campus, Medinipur, West Bengal	West Bengal
53.	International Workshop on Digital Libraries using Greenstone Software	Workshop	12-16 Dec.	2011	5 Days	IIM Kozhikode, Kerala	IIM Kozhikode, Kerala	Kerala
54.	International Conference on Digital Libraries and Knowledge Organization (ICDK 2011)	Conference	14-16 Feb.	2011	3 Days	Management Development Institute (MDI) Indian Association of Special Libraries and Information Centers (IASLIC) INDEST-AICTE Consortium, Indian Institute of Technology (IIT), Delhi	MDI Gurgaon (National Capital Region – Delhi)	Delhi

55.	Work-Shop on Managing Digital Resources In Academic Libraries	Workshop	19 Feb.	2011	1 Day	Dakshina Kannada And Kodagu Library Association(R) (Dkkla) In Association with T.A. Pai Management Institute, Manipal, Karnataka	T.A. Pai Management Institute, Manipal, Karnataka	Karnataka
56.	National Workshop On Design And Development Of Digital Libraries Using DSpace	Workshop	12-13 April	2012	2 Days	Integrated Academy of Management and Technology (INMANTEC) In Association with Intellectuals Society for Socio Techno Welfare (ISST)And Ranganathan Society for Social Welfare & Library Development	Information Resource centre INMANTEC Institutions, Delhi - Hapur Bypass, NH-24	Delhi
57.	National Conference on K-2012: Creating Digital Library in Globalized E-society	Conference	28-Jul	2012	1 Day	Society for information research & studies (SIRS)	Society for Information Research & Studies (SIRS), New Delhi	Delhi
58.	International Workshop on Digital Libraries using Greenstone Software	Workshop	20-24 Aug	2012	5 Days	IIM Kozhikode, Kerala	IIM Kozhikode, Kerala	Kerala
59.	International Conference on Digital libraries (ICDL 2013)	Conference	27-29 Nov.	2013	3 Days	TERI, New Delhi	TERI, New Delhi	Delhi
60.	National workshop on design and development of digital libraries using DSpace	Workshop	22-23 March	2013	2 Days	Marian College, Kuttikkanam, Kottayam District, Kerala	Marian College, Kuttikkanam, Kottayam District, Kerala	Kerala
61.	9th National Conference on the theme "Towards a Semantic Digital Library infrastructure	Conference	18-19 Dec.	2013	2 Days	Indira Gandhi Centre for Atomic Research, Kalpakkam, Tamil Nadu	Indira Gandhi Centre for Atomic Research, Kalpakkam, Tamil Nadu	Tamil Nadu
62.	15th International Conference on Asia-Pacific Digital Libraries (ICADL 2013)	Conference	9-11 Dec.	2013	3 Days	International School of Information Management and University of Mysore	Hotel Le Meridien, Bangalore, Karnataka	Karnataka

63.	National workshop on design and development of digital libraries using DSpace	Workshop	9-10 Jan.	2014	2 Days	Marian College, Kuttikkanam, Kottayam District, Kerala	Marian College, Kuttikkanam, Kottayam District, Kerala	Kerala
64.	National Workshop on Creation and Management of Digital Collection scheduled at INFLIBNET Centre, Gandhinagar	Workshop	10-14 Feb.	2014	5 Days	The INFLIBNET Centre, Gandhinagar	The INFLIBNET Centre, Gandhinagar	Gujarat
65.	AICTE Sponsored Workshop on Developing Green Stone Digital Libraries	Workshop	20-24 Jan.	2014	5 Days	T.A. Pai Management Institute, Manipal	TAPMI premises, Manipal	Karnataka
66.	One Day Workshop on "Digital Library and Journal	Workshop	11-Aug	2014	1 Days	Informatics Publishing Limited, Bangalore	University Library Conference Hall, J N T University Hyderabad, Kukatpally, Hyderabad, Telangana	Telangana
67.	The National Conference on "Trends in Management of Academic Libraries in Digital Environment (TMALDEN-2014)	Conference	19 -20 Dec.	2014	2 Days	Jain University, Bangalore, Karnataka	Bangalore, Karnataka	Karnataka
68.	UGC sponsored One-day National Workshop on DSPACE: An Open-Source Software for Digital Library Initiatives	Workshop	10 Jan.	2015	1 Days	Department of Library and Information Science, Bharathidasan, University, Tiruchirappalli, Tamil Nadu	Department of Library and Information Science, Bharathidasan, University, Tiruchirappalli, Tamil Nadu	Tamil Nadu
69.	Two Days Advanced National Training in Digital Library Management using DSpace.	Short Term Training Programme	24-25 April	2015	2 Days	The Kerala Agricultural University collaboration with the Academic Library Association	The Kerala Agricultural University, Central Library, Thrissur, Kerala	Kerala

70.	Two-Day UGC Sponsored National Workshop on "Developing Digital Library using DSpace"	Workshop	6-7 Aug.	2015	2 Days	Sri Venkataramana Swamy College, Bantwal, Mangalore, Karnataka in collaboration with Dakshina Kannada & Kodagu Library Association.	Sri Venkataramana Swamy College, Bantwal, Mangalore, Karnataka	Karnataka
71.	One-week Short Term Course on "Digital Library and E-Resource Management"	Short Term Training Programme	17-22 Aug.	2015	1 Week	UGC-Human Resource Development Centre, Mizoram University	Department of Library and Information Science, Mizoram University, Aizawl	Mizoram
72.	User Awareness Program on UGC INFONET Digital Library Consortium	Short Term Training Programme	24-25 Aug.	2015	2 Days	Visva-Bharati Library Network & INFLIBNET	Central Library, Visva-Bharati Library Network, Santi Niketan, Birbhum, West Bengal	West Bengal
73.	National Workshop on Creation of IR using Open-Source Software	Workshop	26-28 Aug.	2015	3 Days	INFLIBNET Centre, Infocity, Gandhinagar, Gujarat	INFLIBNET Centre, Infocity, Gandhinagar, Gujarat	Gujarat
74.	National Conference on Bridging the Digital Divide: Open Source and Open Access Movement	Conference	11-12 March	2016	2 Days	Department of Studies in Library and Information Science, University of Mysore, Manasagangotri, Mysuru (UGC-SAP (DRS II))	Department of Studies in Library and Information Science, University of Mysore, Manasagangotri, Mysuru	Karnataka
75.	National Workshop on Design & Development of Institutional Repository using DSpace at Chintech	Workshop	7-8 Jan.	2016	2 Days	Chinmaya Institute of Technogym, (Chintech) Kannur in collaboration with Dept. of Library & Information Science, & Central Library Kannur University	Chinmaya Institute of Technogym, (Chintech) Kannur	Kerala

76.	Seminar on "Application of Digital Library and E-Resource in Research and Management Studies	Seminar	21 Jan.	2016	1 Day	Department of Library and Information Center, Jain College, Rajarajeshwarinagar, Bangalore	Seminar Hall, Jain College, R R Nagar, Bangalore	Karnataka
77.	2 Day National Workshop on "DSpace: Hands on Experience"	Workshop	22-23 Feb.	2016	2 Days	BMS Institute of Technology & Management, Bangalore	BMS Institute of Technology & Management, Bangalore	Karnataka
78.	ICDL 2016 (Smart Future Knowledge Trends That Will Change the World)	Conference	14-16 Dec.	2016	3 Days	The Energy and Resources Institute (TERI), New Delhi	TERI, IHC, New Delhi	New Delhi
79.	National Workshop on Metadata Standards: Retrospective Conversion, Preservation and Migration scheduled	Workshop	16-18 May	2016	3 Days	INFLIBNET Centre, Gandhinagar, Gujarat	INFLIBNET Centre, Gandhinagar, Gujarat	Gujarat
80.	NISCAIR Training Programme on "Design and Development of Digital Libraries using DSpace - Advance"	Short Term Training Programme	29 Feb.- 4 March	2016	5 Days	CSIR - NISCAIR, 14 Satsang Vihar Marg, Special Institutional Area, New Delhi	CSIR - NISCAIR, 14 Satsang Vihar Marg, Special Institutional Area, New Delhi	New Delhi
81.	National Workshop on Building Institutional Repository and Website/Blog – DSpace and WordPress	Workshop	6-10 June	2016	5 Days	Biju Patnaik Central Library (BPCL) of National Institute of Technology Rourkela	NIT Rourkela, Odisha	Odisha

82.	Three days National Workshop on Creating and Managing Digital Libraries using Eprints	Workshop	10-12 Aug	2016	3 Days	INFLIBNET Centre, Gandhinagar, Gujarat	INFLIBNET Centre, Gandhinagar, Gujarat	Gujarat
83.	DELNET : Lecture on "Digital Content : Strategies for the Future"	Lecture	11 May	2016	1 Day	DELNET-Developing Library Network (DELNET), New Delhi	DELNET-Developing Library Network (DELNET), New Delhi	New Delhi
84.	5 Day National Workshop on "Digital Content and E-Learning Module Development	Workshop	9-13 Aug.	2016	5 Days	Central Library of College of Engineering, Thalassery, Kerala	Central Library of College of Engineering Thalassery, Thalassery, Kerala	Kerala
85.	National iETD 2016 Conference on the theme "Evolving ETDs to Knowledge Repositories"	Conference	5-7 Oct.	2016	3 Days	Information and Library Network Center (an IUC of UGC), Gandhinagar, Gujarat	Information and Library Network Center (an IUC of UGC), Gandhinagar, Gujarat	Gujarat
86.	NISCAIR Training Programme on "Design and Development of Institutional Repositories using DSpace"	Short Term Training Programme	1-5 Aug.	2016	5 Days	CSIR - NISCAIR, 14 Satsang Vihar Marg, Special Institutional Area, New Delhi	CSIR - NISCAIR, 14 Satsang Vihar Marg, Special Institutional Area, New Delhi	New Delhi
87.	One-Day Seminar on 'Libraries go Digital'	Seminar	26 Sep.	2016	1 Day	Mysore University Information and Library Science Alumni Network (MILAN)	Shri Jayachamarajendra College of Engineering (SJCE), Manasagangotri, Mysuru	Karnataka
88.	CSIR-NISCAIR Training Programme on "Design and Development of Institutional Repositories using DSpace-Advance"	Short Term Training Programme	7-11 Nov.	2016	5 Days	CSIR - NISCAIR, 14 Satsang Vihar Marg, Special Institutional Area, New Delhi	CSIR - NISCAIR, 14 Satsang Vihar Marg, Special Institutional Area, New Delhi	New Delhi

89.	Current Trends in Digital Library and Discovering e-Journals through J-Gate	Seminar	30 Nov.	2016	1 Day	Pune Institute of Computer Technology, Pune	PICT Campus, Dhankawadi, Pune	Maharashtra
90.	Three Days Advanced Training Program on Shodhganga	Short Term Training Programme	14-16 Dec.	2016	3 Days	INFLIBNET Centre, Gandhinagar, Gujarat	INFLIBNET Centre, Gandhinagar, Gujarat	Gujarat
91.	Post Graduate Diploma in Digital Library and Information Management"	PG Diploma	-	2017-18	1 Year	Centre for Library and Information Management Studies (CLIMS), Tata Institute of Social Sciences, Mumbai	Centre for Library and Information Management Studies (CLIMS), Tata Institute of Social Sciences, Mumbai	Maharashtra
92.	4th NATIONAL CONFERENCE iETD 2017	Conference	26-27 Sep	2017	2 Days	INFLIBNET Centre, Gandhinagar, Gujarat	INFLIBNET Centre, Gandhinagar, Gujarat	Gujarat
93.	3rd Virtual Workshop on DSpace - an Open-Source IR Software	Workshop	10 Sep.	2017	1 Day	Dhanwantari Prakash Tripathi, Assistant Librarian, Periodicals Biju Patnaik Central Library National Institute of Technology Rourkela, Odisha	www.dpatripathi.in	Odisha
94.	Informatics Endowment lecture on Digital Libraries -2017	Seminar	24 Oct.	2017	1 Day	Department of Library and Information Science, Manasagangotri, University of Mysore, Mysuru	Seminar Hall, Department of Studies in Library and Information Science, Manasagangotri, Mysuru	Karnataka
95.	National workshop on Designing and Developing Library Website and Institutional Repositories using Open-Source Software	Workshop	8-9 Dec	2017	2 Days	The Resource Center, National Institute of Fashion Technology, Mumbai	The Resource Center, National Institute of Fashion Technology, Mumbai	Maharashtra

96.	Seminar-5 Digital preservation: an overview	Seminar	12 Oct.	2017	1 Day	Documentation Research and Training Centre (DRTC), Indian Statistical Institute, Bangalore, Karnataka	Documentation Research and Training Centre (DRTC), Indian Statistical Institute, Bangalore, Karnataka	Karnataka
97.	SEMINAR-6: Digital Image Processing: An Overview	Seminar	24 Oct.	2017	1 Day	Documentation Research and Training Centre (DRTC), Indian Statistical Institute, Bangalore, Karnataka	Documentation Research and Training Centre (DRTC), Indian Statistical Institute, Bangalore, Karnataka	Karnataka
98.	NDL workshop on DSpace	Workshop	24-25 Nov	2017	2 Days	Central Library of Indian Institute of Technology (ISM) Dhanbad in collaboration with National Digital Library (an NME-ICT Project of IIT Kharagpur)	IIT(ISM), Dhanbad	Jharkhand
99	Three days National Workshop on Metadata Standards: Retrospective Conversion, Preservation and Migration	Workshop	6-8 June	2018	3 Days	INFLIBNET Centre, Gandhinagar, Gujarat	INFLIBNET Centre, Gandhinagar, Gujarat	Gujarat
100.	Three days National Workshop on Creating and Managing Digital Libraries using Eprints	Workshop	8-10 Aug.	2018	3 Days	INFLIBNET Centre, Gandhinagar, Gujarat	INFLIBNET Centre, Gandhinagar, Gujarat	Gujarat
101.	PG Diploma in Digital Library and Data Management (evening)	PG Diploma	-	2018	1 Year	IGNCA, New Delhi	IGNCA, New Delhi	New Delhi

102.	One week workshop cum training course on DSpace & SOUL 2.0	Workshop	24-29 July	2018	6 Days	Department of Library & Information Science, Shivaji University, Kolhapur and Barr. Balasaheb Khardekar Knowledge Resource Centre in collaboration with INFLIBNET Center, Gandhi Nagar	Department of Library & Information Science, Shivaji University, Kolhapur	Maharashtra
103.	CPE funded Three-Day National Workshop on "Creating and Managing Digital Libraries using Eprints"	Workshop	06 - 08 Sep	2018	3 Days	INFLIBNET Centre Gandhinagar and Vellalar College for Women, Erode-12, Tamil Nadu	Vellalar College for Women (Autonomous), Thindal, Erode-638012, Tamil Nadu	Tamil Nadu
104.	SEMINAR - 3 Topic - Digital Curation : An Overview	Seminar	23 Aug.	2018	1 Day	Indian Statistical Institute Documentation Research and Training Centre 8th mile, Mysore Road, RVCE post Bangalore	DRTC Classroom (G 21), ISI, Bangalore	Karnataka
105.	Seminar- 5 Digital Divide: An overview with special emphasis on India	Seminar	6 Nov.	2018	1 Day	Indian Statistical Institute Documentation Research and Training Centre 8th mile, Mysore Road, RVCE post Bangalore	DRTC Classroom (G 21), ISI, Bangalore	Karnataka
106.	Two Day National Workshop on "Design and Development of Digital Library Using DSpace"	Workshop	25-26 Oct	2018	2 Days	University Library, Central University of Kerala, Kerala	University Library, Central University of Kerala, Kerala	Kerala

107.	SEMINAR-14 Topic: Digital Rights Management- An Overview	Seminar	30 Oct.	2018	1 Day	Indian Statistical Institute Documentation Research and Training Centre 8th mile, Mysore Road, RVCE post Bangalore	DRTC Classroom (G 21), ISI, Bangalore	Karnataka
108.	Five- Day NATIONAL Workshop on Library Automation & Digitization	Workshop	17-21, Dec	2018	5 Days	University of Delhi South Campus, New Delhi	University of Delhi South Campus, New Delhi	New Delhi
109.	Advance Workshop on Koha and DSpace	Workshop	20-24 May	2019	5 Days	Biju Patnaik Central Library (BPCL), NIT Rourkela, Odisha	Biju Patnaik Central Library (BPCL), NIT Rourkela, Odisha	Odisha
110.	Informatics Endowment Lecture Series on Digital Libraries	Lecture	18 Feb	2019	1 Day	Department of Studies in Library and Information Science University of Mysore, Mysore	Vijnana Bhavan Auditorium, Vijnana Bhavan, Manasagangotri, Mysuru	Karnataka
111.	One Week National Workshop on Metadata Management and Open-Source Discovery Systems for Libraries	Workshop	24-29 June	2019	6 Days	INFLIBNET Centre, Gandhinagar, Gujarat	INFLIBNET Centre, Gandhinagar, Gujarat	Gujarat
112.	International workshop on digital archiving	Workshop	10-12 June	2019	3 Days	Indira Gandhi National Centre for Arts (IGNCA) (Autonomous body of Ministry of Culture, Government of India), New Delhi	Indira Gandhi National Centre for Arts (IGNCA) (Autonomous body of Ministry of Culture, Government of India), New Delhi	New Delhi

113.	Post Graduate Diploma in Digital Library and Information Management"	PG Diploma	-	2019-20	1 Year	Centre for Library and Information Management Studies (CLIMS), Tata Institute of Social Sciences, Mumbai	Centre for Library and Information Management Studies (CLIMS), Tata Institute of Social Sciences, Mumbai	Maharashtra
114.	National Seminar on Digital and RFID Technologies for Modern Libraries	Seminar	28 Dec	2019	1 Day	Kerala Agricultural University (KAU, Kerala	Kerala Agricultural University (KAU, Kerala	Kerala
115.	2-day Conference on "Information Transformation and Informatics in the Digital Era: Opportunities and Challenges"	Workshop	12-13 March	2019	2 Days	CSIR-National Institute of Science Communication and Information Resources (CSIR-NISCAIR) and CSIR-Traditional Knowledge Digital Library (CSIR-TKDL, New Delhi	NAAS, NASC Complex, New Delhi	New Delhi
116.	One Day Seminar on "Innovation & Sustainable Library Services in Digital Era"	Seminar	4 Feb	2020	1 Day	CFTRI Library, Mysuru In association with ICSSR, New Delhi and support of AFST(I), Mysuru, American Chemical Society and Springer Nature.	CFTRI Library, Mysuru	Karnataka
117.	2-day Conference on "Information Transformation and Informatics in the Digital Era: Opportunities and Challenges	Conference	12-13 March	2020	2 Days	CSIR-National Institute of Science Communication and Information Resources (CSIR-NISCAIR) and CSIR-Traditional Knowledge Digital Library (CSIR-TKDL) Unit, New Delhi	NAAS, NASC Complex, New Delhi	New Delhi
118.	National Conference on Digital Scholarship –NCDS2020	Conference	12-13 March	2020	2 Days	Central University of Tamil Nadu, Thiruvarur.	Central University of Tamil Nadu, Thiruvarur.	Tamil Nadu

119.	BLA Webinar Series 01 on Institutional Digital Repository. Session 3 Topic: Live Demo of DSpace Features and Troubleshooting Techniques.	Webinar	30 April	2020	1 Day	Bengal Library Association	Online	West Bengal
120.	Meeting on Digital Licensing	Webinar	8 May	2020	1 Day	Telangana Library Association	Online	Telangana
121.	Webinar on Lesser-Known Digital Libraries in India: Emerging Initiatives	Webinar	22 August	2020	1 Day	Society for the Advancement of Library and Information Science, (SALIS) Chennai	Online	Tamil Nadu
122.	Webinar on "Green ICT and Data Centres for Digital Transformation"	Webinar	5 Dec.	2020	1 Day	CSI, ACM & IEEE CS Madras	Online	Tamil Nadu
123.	Lecture on Digital Libraries and Research Data Management	Webinar	27 Nov.	2020	1 Day	Informatics India Ltd, Bangalore National Institute of Advanced Studies, Bangalore CSIR Fourth Paradigm Institute, Bangalore Rajiv Gandhi University of Health Sciences, Bangalore	Online	Karnataka
124.	Lecture on eScience and Digital Libraries – Curtain-raiser	Webinar	6 Nov.	2020	1 Day	Informatics India Ltd, Bangalore National Institute of Advanced Studies, Bangalore CSIR Fourth Paradigm Institute, Bangalore Rajiv Gandhi University of Health Sciences, Bangalore	Online	Karnataka

CHAPTER – 5

RESPONSES OF LIS PROFESSIONALS

(DATA ANALYSIS AND INTERPRETATION)

5.0 Introduction

In order to assess the required information about the various aspects of digital library education and training in India, opportunities by the way of new development and challenges faced managing in a better future from faculty members and students/learners of digital libraries in India. The data was collected by administering the two carefully designed questionnaires: One was for teachers/experts of digital libraries and second was for students /practitioners of digital libraries. After the collection of data, the next step in the process of research was the analysis and interpretation of the collected data. Thus, the data was then presented, compared and analysed with the help of tables, figures and statistical measures were applied to analyse the data. Analysis of data and findings are presented below in two sections:

Section – I: Survey of Faculty / Experts of Digital Libraries

Section – II: Survey of Students / Learners of Digital Libraries

Section – I: Survey of Faculty / Experts of Digital Libraries

5.1 Survey of Faculty / Experts of Digital Libraries

The faculty / expert's questionnaire was dealt with their opinion regarding different aspects of challenges and opportunities of digital library education and training in India. The questionnaire was divided into three parts: 1. Demographic Information; 2. Background knowledge and experience, and 3. Attitude of respondents regarding digital library education and training in India along with suggestions and overall comments. Total number of **80 responses** were received and are analysed here to achieve objective of the study. The analysis is presented below in various sections.

5.1.1 Demographic Information of Faculty / Experts

Demography refers to the fundamental and measurable statistics of a population with characteristics such as gender, age, education etc. The table below also provides demographic statistics of faculty / experts of digital library (respondents) in terms of gender, age, education. The analysis of the data is done in the following manner:

5.1.1.1 Age Group of Digital Library Faculty / Experts

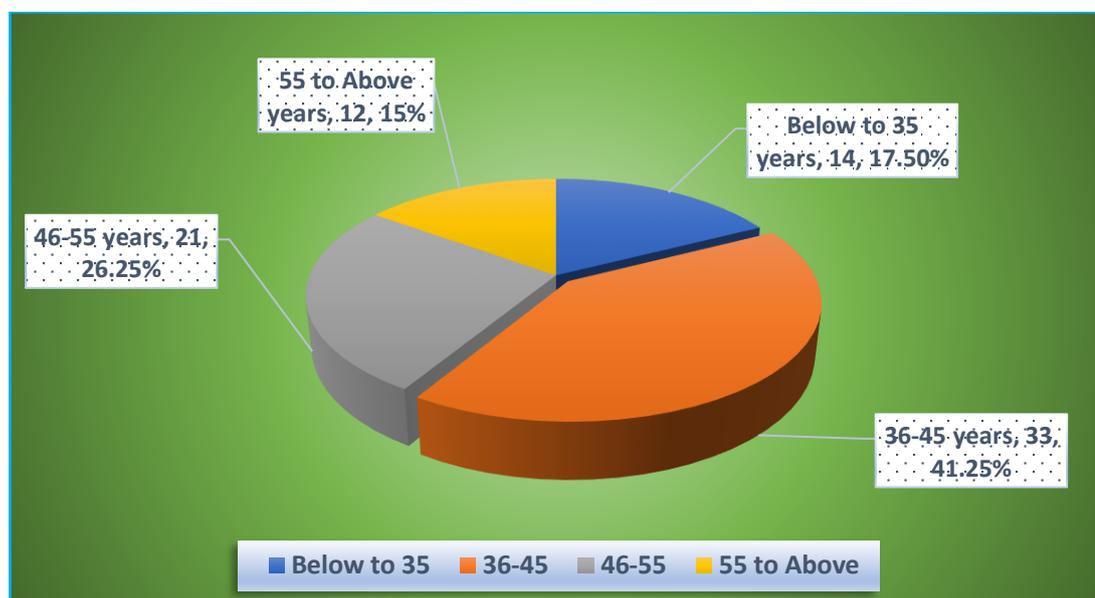


Figure 5.1.1: Age Group of Faculty / Experts of Digital Libraries

The above Figure 5.1.1 illustrates the different age groups of the faculty/experts of digital libraries. The analysis shows that the highest number of respondents i.e., 33 (41.25%) are in the age group between 35-45 years, followed by 21 (26.25%) in the age bracket of 46-55 years and, 14(17.50%) in the age group of below to 35 years. Only 12 (15%) were above to 56-year-old. Thus, it can be concluded that the majority of the respondents (58.75%) comes in the age group between 36 to 55 years which was natural since the population of the study included faculty/experts of digital libraries and mature or young respondents.

5.1.1.2 Gender-wise Distribution of Faculty / Experts

The gender wise distribution of faculty/experts' respondents is presented in the below Figure 5.1.2. The responses received from male and female respondents from the faculty/experts of digital libraries. Out of 80 respondents, 57 (71%) respondents are males while 23 (29%) are female. The data reveals that the representation of male

respondents is much more than that of the female respondents, it's almost double. It means there are majority of male faculty / experts of digital libraries than female faculty /experts of digital libraries in India.

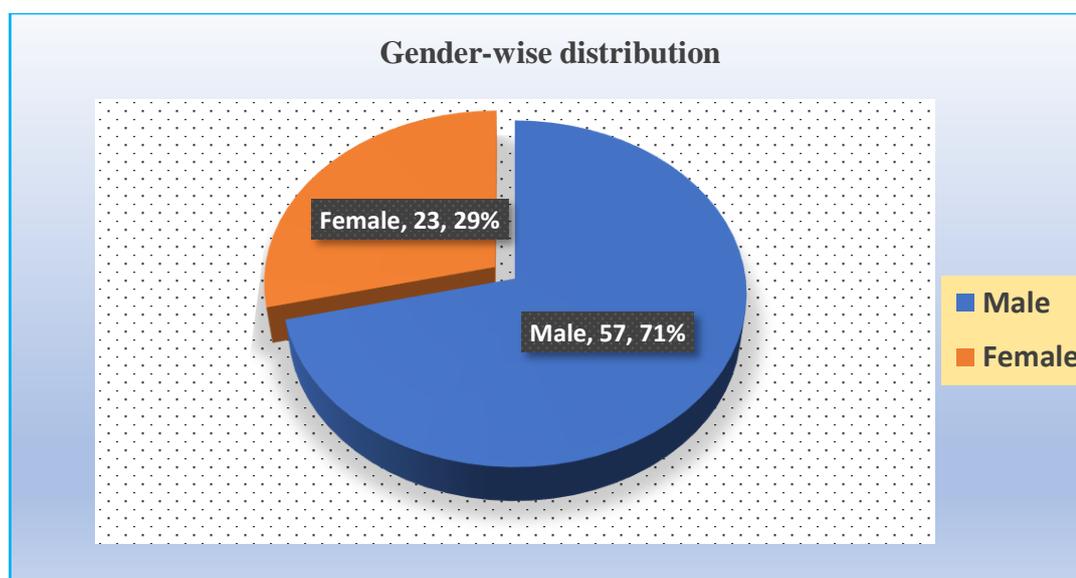


Figure 5.1.2: Gender-wise Distribution of Faculty / Experts of Digital Libraries

5.1.1.3 State wise Frequencies of Faculty / Experts of Digital Libraries

Below figure 5.1.3 shows state wise distribution of responses (faculty / experts of digital libraries) received from different states of India. 80 respondents offered their responses/ opinion on various aspects of digital library training and education from different 24 states out of 28 states and 8 Union territories in the country. Majority of respondents are from Tamil Nadu (11); Karnataka (9) and Uttar Pradesh (6). From Maharashtra and Rajasthan, five (i.e., 5) respondents in each state. Four (i.e., 4) respondents in each state were from Delhi; Gujarat and Kerala. Same as three (i.e., 3) respondents in each state were from Andhra Pradesh; Assam; Haryana; Jammu and Kashmir; Mizoram; Puducherry and West Bengal. Two (i.e., 2) respondents in each state were from Madhya Pradesh and Manipur. From Chandigarh; Goa; Himachal Pradesh; Meghalaya; Punjab; Telangana and Tripura, only one respondent in each state was contributed of their opinions for the study.

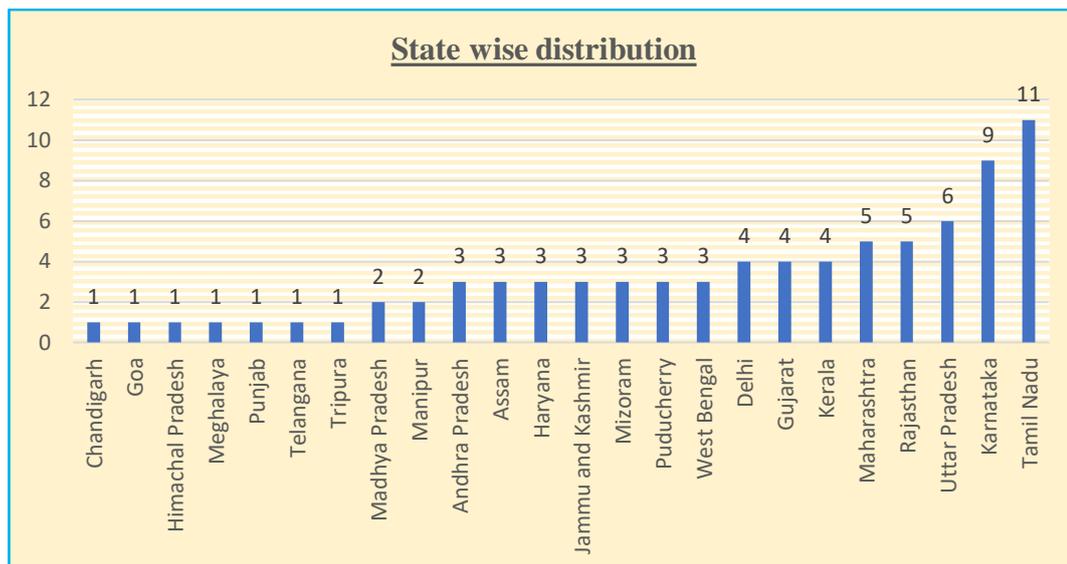


Figure 5.1.3: Graphical Representation of State Wise Distribution of Faculty / Experts

5.1.2 General Background Knowledge of Faculty/ Experts of Digital Libraries

In this part of the questionnaire, researcher examined general background knowledge about digital libraries from the faculty/ experts of digital libraries respondents such as their overall teaching experience vs digital library education and training experience; profile (level of experience) of the faculty/ experts of digital libraries; involvement of faculty/experts in digital library education and training related activity(s) and their specialized area in training/education of digital library. The analysis of the data has been done in the following manner:

5.1.2.1 Overall Teaching Experience vs Digital Library Education and Training Experience of the Faculty/ Experts

The LIS teachers have different levels of experience i.e., overall teaching experience and specific teaching and training experience of digital libraries. Table 5.1.1 shows frequency of responses about overall teaching experience vs digital library training experience. Only 14 (i.e., 17.50%) respondents are less than 5-year overall teaching experience, but from same range of experience 22 (i.e.,27.50%) teachers have been interested in the area of digital library education and training. Whereas, 22 (i.e.,27.50%) respondents are 5 to 10 years overall teaching experience, while from same range of experience 32 (i.e.,40.00%) teachers have been interested in the area of digital library education and training. From the range of 10 to 15 years experienced, 18 (i.e.,22.50%) respondents have overall teaching experience, while from the same

range of experience 16 (i.e.,20.00%) have been interested in the area of digital library education and training. Whereas, 26 (32.50%) respondents have more than 15 years overall teaching experience, but from same range of experience only 10 (12.50%) teachers have been interested in the area of digital library education and training. Figure 5.1.4 shows the graphical representation of the same.

Table – 5.1.1: Overall Teaching Experience Vs Digital Library Education and Training Experience of the Faculty

Experience (in years)	Q. V1.2 Overall teaching experience	Q. V2.1 How long have you been interested in the area of digital library education and training?
	No. of responses (%)	No. of responses (%)
Less than 5 years	14 (17.50%)	22 (27.50%)
5 to 10 years	22 (27.50%)	32 (40.00%)
10 to 15 years	18 (22.50%)	16 (20.00%)
More than 15 years	26 (32.50%)	10 (12.50%)
Missing	00 (00.00%)	00 (00.00%)
Total	80 (100%)	80 (100%)

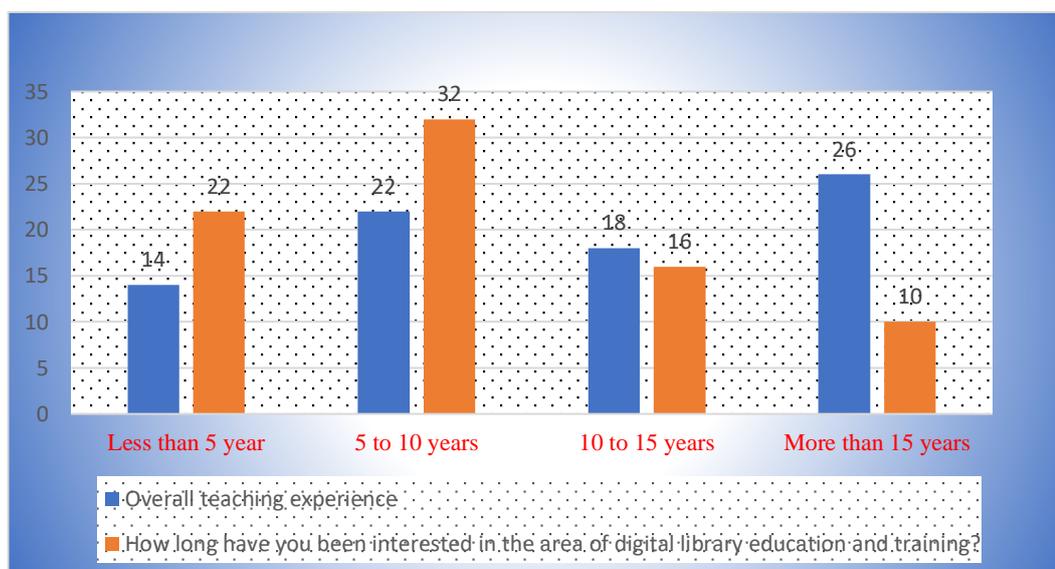


Figure 5.1.4: Graphical Representation of Overall Teaching Experience Vs Digital Library Education and Training Experience of the Faculty

Because the concept of digital library is not very old. So, it is clear to above table that majority of 87.50% were below to 15 years overall teaching experienced young faculty / experts, who have been much interested in the area of digital library education and training.

5.1.2.2 Profile of the Faculty/ Experts of Digital Libraries

As it was an open survey available to all faculty / experts of digital libraries, it was necessary to analyse to current position the faculty/experts to how many of them are junior, middle, senior or other they like to feel as a professional involved in digital libraries education/training or development. Figure 5.1.5 shows the profile of the respondents.

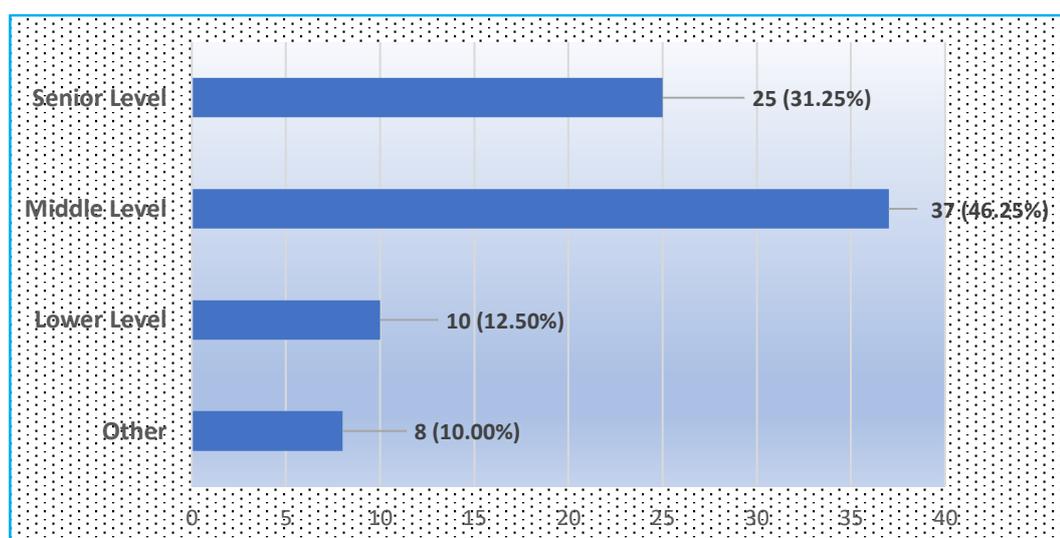


Figure 5.1.5: Profile (Level of Experience) of the Faculty/ Experts of Digital Libraries

It can be seen from Figure 5.1.5 that the majority 37(i.e., 46.25%) were middle level faculty members and 25 (i.e., 11.25%) were senior level and 10 (12.50%) were junior level faculty members. 8(i.e., 10%) respondents were mentioned another role e.g., Irregularly, Not specific, No role, Not applicable, etc. Although 76.50% percent of the respondents are middle and senior level faculty /experts in digital libraries.

5.1.2.3 Involvement of Faculty/Experts in Digital Library Education and Training Related Activity(s)

There can be many different activities in which teachers are involved with their main role of teaching. Such related 10 activities have shortlisted that consider as part of digital library education and training are mentioned in Table 5.1.2. It was necessary

to know the operational areas of the respondents or specific activities related to digital library education and training. Table 5.1.2 shows the operational areas of the respondents at the time to time.

The majority of 72.50% respondents were involved in taking classes of digital library related paper at postgraduate level in the University/College. About 50-60% respondents were involved in conducting training programmes /workshops / seminars / conferences on digital libraries with providing support during the such training programmes and publishing research articles / manuals /guides on digital libraries. 47.50% respondents were involved in providing technical assistance to students in creation / development of digital libraries and carrying out research work on digital libraries. 35.00% respondents were involved in editing publications such as books/ newsletters/journals on digital libraries and creating and maintaining digital libraries. 33.75% respondents were involved in publishing in digital libraries/ institutional repositories and preparing study learning material /course content on digital libraries. 26.25% respondents were involved in engaging in programming / networking / software side area for digital libraries. While only 8.75% respondents were involved in trouble shooting handling in creation and development of digital libraries. While 6.25% respondents were involved in in other activities related to education and training of digital libraries.

Table – 5.1.2: Involvement of Faculty/Experts in Digital Library Education and Training Related Activity(s)

S. No.	Digital library education and training related activity(s)	Responses	Percent	Total
1	Taking classes of digital library related paper at postgraduate level in the University/College	58	72.50%	80
2	Conducting training programmes /workshops / seminars / conferences on digital libraries	47	58.75%	80
3	Publishing research articles / manuals /guides on digital libraries	44	55.00%	80
4	Providing support during training programmes / workshops / seminars / conferences on digital libraries	41	51.25%	80
5	Providing technical assistance to students in creation / development of digital libraries	38	47.50%	80

6	Carrying out research work on digital libraries	38	47.50%	80
7	Editing publications such as books/ newsletters/journals on digital libraries	28	35.00%	80
8	Creating and maintaining digital libraries	28	35.00%	80
9	Publishing in digital libraries/ institutional repositories	27	33.75%	80
10	Preparing study learning material /course content on digital libraries	27	33.75%	80
11	Engaging in programming / networking / software side area for digital libraries	21	26.25%	80
12	Trouble shooting handling in creation and development of digital libraries	15	18.75%	80
13	Other	5	6.25%	80

5.1.2.4 Specialized Area in Training/Education of Digital Library

The respondents who were engaged in different digital library education and training related activity(s) as mentioned in above Table 5.1.3. In order to know, their specialized area in training/education of digital library, a descriptive question was asked. The responses received are summarized below in Table 5.1.3:

Table – 5.1.3: Specialized Area in Training/Education of Digital Library

Responses	Responses
<ul style="list-style-type: none"> • <i>Creating digital libraries</i> 	<ul style="list-style-type: none"> • <i>Done a couple of short courses</i>
<ul style="list-style-type: none"> • <i>Technical background</i> 	<ul style="list-style-type: none"> • <i>Access to digital libraries and resources for study and research purposes. Software management</i>
<ul style="list-style-type: none"> • <i>DL Softwares</i> 	<ul style="list-style-type: none"> • <i>Information literacy and open access</i>
<ul style="list-style-type: none"> • <i>As a moderator</i> 	<ul style="list-style-type: none"> • <i>Customization of DSpace in Indian language with special reference to Hindi and Marathi.</i>
<ul style="list-style-type: none"> • <i>Creation of Digital Archive Using OJS (Open Journal System)</i> 	<ul style="list-style-type: none"> • <i>DSpace and similar software implementation</i>
<ul style="list-style-type: none"> • <i>Mainly focusing digital (virtual) library</i> 	<ul style="list-style-type: none"> • <i>Designing of D L</i>

<ul style="list-style-type: none"> • <i>Software and hardware for digital library</i> 	<ul style="list-style-type: none"> • <i>Training on DSpace from INFLIBNET</i>
<ul style="list-style-type: none"> • <i>Blog</i> 	<ul style="list-style-type: none"> • <i>Greenstone, Drupal</i>
<ul style="list-style-type: none"> • <i>Trained for Developing IR on DSpace, Greenstone and Joomla</i> 	<ul style="list-style-type: none"> • <i>ICT Applications in IR from NCSI, IISc, Training on KOHA,</i>
<ul style="list-style-type: none"> • <i>Institutional Repository</i> 	<ul style="list-style-type: none"> • <i>E-resources management</i>
<ul style="list-style-type: none"> • <i>Digital library</i> 	<ul style="list-style-type: none"> • <i>Digital library softwares</i>
<ul style="list-style-type: none"> • <i>OCR technology</i> 	<ul style="list-style-type: none"> • <i>Open-Source digital library softwares</i>
<ul style="list-style-type: none"> • <i>DSpace and greenstone</i> 	<ul style="list-style-type: none"> • <i>Integrated library management system</i>
<ul style="list-style-type: none"> • <i>Reading of professional literature</i> 	<ul style="list-style-type: none"> • <i>Management of digital libraries.</i>
<ul style="list-style-type: none"> • <i>Attended workshops on D-space and E-prints</i> 	<ul style="list-style-type: none"> • <i>Training and development of digital library.</i>
<ul style="list-style-type: none"> • <i>Digital Preservation</i> 	<ul style="list-style-type: none"> • <i>Digital Library related topics</i>
<ul style="list-style-type: none"> • <i>Collection development and management of E-resources</i> 	<ul style="list-style-type: none"> • <i>Open source softwares</i>
<ul style="list-style-type: none"> • <i>Digitization, Digital Library Training</i> 	<ul style="list-style-type: none"> • <i>Creation and development of digital library.</i>
<ul style="list-style-type: none"> • <i>Guided learning from mentors and self-learning.</i> 	<ul style="list-style-type: none"> • <i>Digital library software training</i>
<ul style="list-style-type: none"> • <i>Digitization Process and Institutional repositories in various open-source software</i> 	<ul style="list-style-type: none"> • <i>Digital Library Creation through GSDL, DSPACE</i>
<ul style="list-style-type: none"> • <i>Open Access Resources</i> 	<ul style="list-style-type: none"> • <i>Digital Library Management</i>
<ul style="list-style-type: none"> • <i>PG diploma in computer applications, PG diploma in statistical techniques and computing</i> 	<ul style="list-style-type: none"> • <i>Software and hardware for digital library.</i>
<ul style="list-style-type: none"> • <i>In digital library software, i.e., DSpace, IR</i> 	<ul style="list-style-type: none"> • <i>Digital Library and Library Automation</i>
<ul style="list-style-type: none"> • <i>Library Automation, Data Conversion and Digital Library</i> 	<ul style="list-style-type: none"> • <i>Web based library resources and digital library</i>

The background and profile of the respondents show that they constitute an ideal group as majority of them are middle and senior level (as an expert in area of digital libraries), belonging to a over 10 different core activities and having good experience with

specialization of digital library education training. It shows with the study that most respondents have adequate experience to be judged about the different aspects of digital library education and training in the country.

5.1.3 Perception of Digital Library Education in the Country

There are many issues that affect digital library education and training in India. In the context of the faculty/experts of digital library education and training, we can know it through their opinion. In this section respondents were asked that how do they perceive digital library education and training in the country? Respondents were asked about general perception regarding to digital library education in the country as below sections:

5.1.3.1 Agreement with the Topics Related to the Digital Library in the Curriculum of Master Degree of LIS in Indian Universities

The respondents were asked to agreement with the topics related to the digital library in the curriculum of master degree level of LIS at University in the country. Main purpose of this question was to know about that faculty / expert's opinion on existed general components or related topics to the digital library. Basically, main topics which covered in LIS curriculum are as follows: digital library components; digitization; digital library initiatives; technical infrastructure; design and development of digital libraries; digital Information/resource management; digital preservation and achieving; software and hardware for digital libraries; digital library planning and management and issues and challenges in digital libraries. The details of the responses are shown in Table 5.1.4. It indicates that 89.00% of faculty/experts responded with positive reply that they totally agreed with asked question and 11.00% responded with negative reply that they did not agree to the selected topics of digital library. Figure 5.1.6 shows the graphical representation of the same.

Table – 5.1.4: Responses of Topics Related to the Digital Library in the Curriculum of Master Degree of LIS in Indian Universities

(Total Resp. = 80)

S. No.	Topics related to the digital library in the curriculum of Master degree of LIS in Indian Universities	Yes	No
1	Digital Library Components	71 (88.75%)	9 (11.25%)

2	Digitization	73 (91.25%)	7 (8.75%)
3	Digital Library Initiatives	70 (87.50%)	10 (12.50%)
4	Technical Infrastructure	65 (81.25%)	15 (18.75%)
5	Design and Development of Digital Libraries	71 (88.75%)	9 (11.25%)
6	Digital Information/Resource Management	74 (92.50%)	6 (7.50%)
7	Digital Preservation and Achieving	70 (87.50%)	10 (12.50%)
8	Software and Hardware for Digital Libraries	71 (88.75%)	9 (11.25%)
9	Digital Library Planning and Management	72 (90.00%)	8 (10.00%)
10	Issues and Challenges in Digital Libraries	72 (90.00%)	8 (10.00%)
Average		70.9 (89.00%)	9.1 (11.00%)

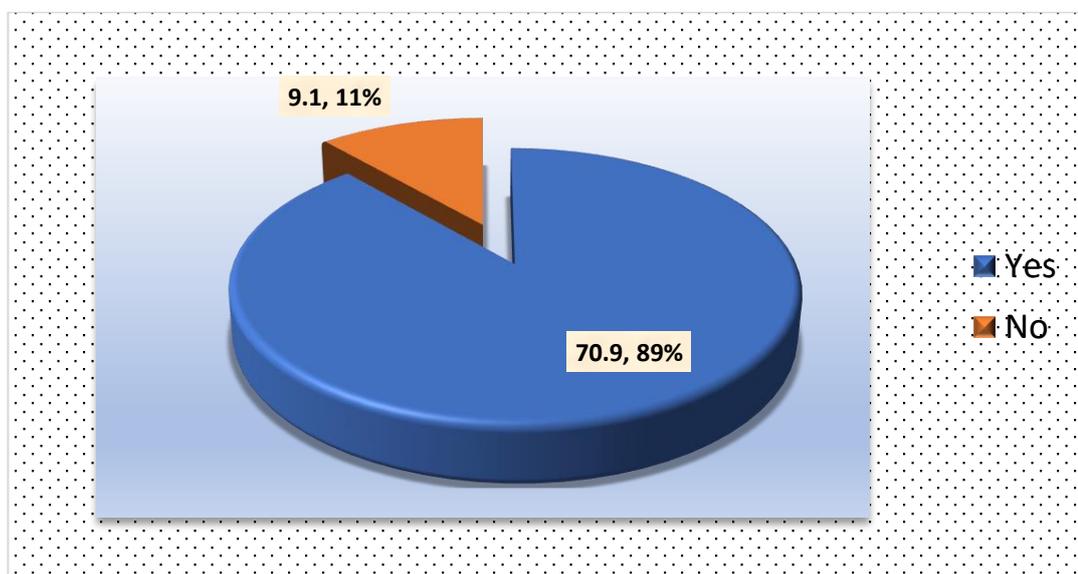


Figure 5.1.6: Graphical Representation of Responses of Topics Related to the Digital Library in the Curriculum of Master Degree of LIS in Indian Universities

5.1.3.2 Need to Improve Digital Library Component in LIS Courses

Respondents were asked to mention whether they feel the need to improve digital library components in LIS courses. The details of the responses are shown in Table 5.1.5. All of the respondents stated that there is strong need to improve digital library components in LIS courses. It shows that majority of respondents were not satisfied

with existed digital library components in LIS courses and they would like to change and feel to improve digital library components in LIS courses. Not any respondent was replied against the asked statement. Figure 5.1.7 shows the graphical representation of the same.

Table – 5.1.5: Need to Improve Digital Library Component in LIS Courses

Q. 3.2 Do you consider that LIS Courses need improvement so far digital library component is concerned?		
Yes	80	100.00%
No	00	00.00%
Total	80	

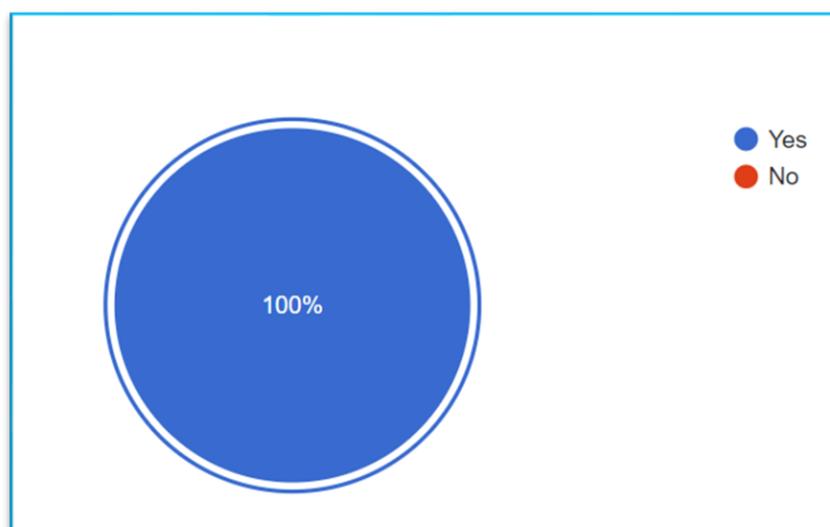


Figure 5.1.7: Need to Improve Digital Library Component in LIS Courses

5.1.3.3 Digital Library Related Topics to be Incorporated in the LIS Curriculum

Fifteen topics as shown in Table 5.1.6 were asked to be selected that may be incorporated in the curriculum for digital libraries. Table 5.1.6 and Figure 5.1.8 show the responses received in this regard. It can be seen that metadata, cataloguing, author submission; archiving and presentation; information storage and retrieval; digital objects, composites and packages; intellectual property rights management, privacy,

protection (watermarking); database systems; naming, repositories, archives; storage and interchange; hypertext and hypermedia; information models and systems; services (searching, linking, browsing, and so forth) were chosen as important by over 50% respondents.

Topics of data modelling; architectures (agents, buses, wrappers/mediators, interoperability); spaces (conceptual, graphical, 2/3D, VR) and transaction processing were recommended for inclusion in the curriculum by 35.00% to 47.50% respondents.

Table – 5.1.6: Digital Library Related Topics to be Incorporated in the LIS Curriculum

S. No.	Digital Library related topics (to be incorporated in curriculum)	Frequency	Percent	Total number of respondents
1	Metadata, Cataloguing, author submission;	50	62.50%	80
2	Archiving and presentation	48	60.00%	80
3	Information storage and retrieval	48	60.00%	80
4	Digital objects, composites and packages	47	58.75%	80
5	Intellectual property rights management, privacy, protection (watermarking)	45	56.25%	80
6	Database systems	44	55.00%	80
7	Naming, repositories, archives;	44	55.00%	80
8	Storage and interchange	42	52.50%	80
9	Hypertext and hypermedia	41	51.25%	80
10	Information models and systems	41	51.25%	80
11	Services (searching, linking, browsing, and so forth)	40	50.00%	80
12	Data modelling	38	47.50%	80
13	Architectures (agents, buses, wrappers/mediators, interoperability)	31	38.75%	80
14	Spaces (conceptual, graphical, 2/3D, VR)	29	36.25%	80
15	Transaction processing	28	35.00%	80

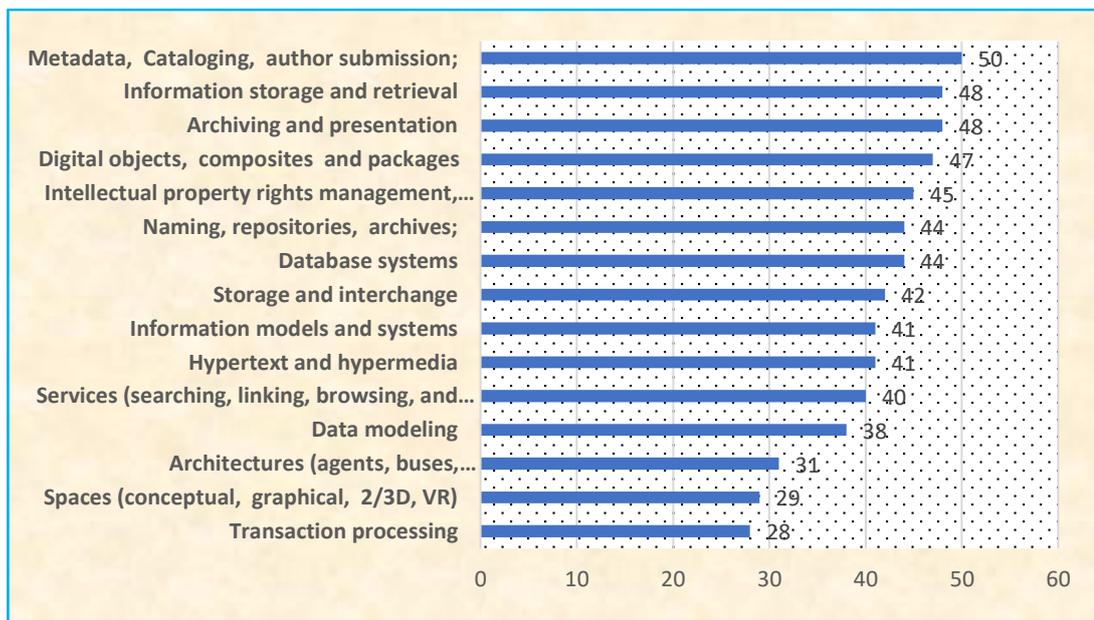


Figure 5.1.8: Graphical Representation of Digital Library Related Topics to be Incorporated in the LIS Curriculum

5.1.4 Attitude of Faculty/Experts Regarding Digital Library Education and Training in India

The main focus of the questionnaire survey was to understand the perceptions about the different issues, challenges and related aspects of digital library education and training in India from faculty/experts' point of view. The questionnaire had related statements in different sections as presented in below tables, which were framed to understand the attitude of faculty/ experts regarding digital library education and training in India. A five–point Likert scale is used for measuring agreement and disagreement on the statement.

5.1.4.1 Faculty / Experts Attitude Towards General Opinion of Digital Library Education and Training in India

An analysis of the data in Table 5.1.7 shows that faculty/experts' attitude towards general opinion of digital library education and training in the country. They were asked four questions related to current state of digital library education and training on which they were to agree or disagree. For the purpose of analysis responses in Table 5.1.7 are clubbed into three groups of combined agreement [Strongly Agree (SA) plus Agree (AG)], combined disagreement [Disagree (DS) plus Strongly Disagree (SD)] and Neutral (NE) in percentages for each statement to highlight dilemmas among groups of respondents.

The statement at 4.1.1, i.e., “Digital library education is in its beginning phase in India.” To this majority of the faculty respondents i.e., 57.50% agreed upon it and 13.75% % in disagreement while 28.75% were neutral.

With regard to the query asked in the statement at 4.1.2, i.e., “Teaching of digital libraries are very essential in LIS curricula” has 98.75% respondents in agreement and only 1.25% in disagreement. It shows that the majority of respondents strongly in favour of teaching of digital libraries are very essential in LIS curricula.

The statement at 4.1.3, i.e., “Digital libraries will be sustainable and much demanded in future” has 91.25% respondents in agreement and 1.25% in disagreement while 7.50% were neutral.

The statement at 4.1.4, i.e., “Shortage of digital library professionals in India” with 81.25% respondents in agreement and 3.75% in disagreement while 15.00% were neutral. It proves that the majority of respondents agreed that there was lack of digital library professionals in the country

Hence, from the table 5.1.7 it is clear that majority of the respondents agreed upon all statements which asked to them regarding general perspectives of digital library education and training in the country. Figure 5.1.9 shows the graphical representation of the same.

Table – 5.1.7: Faculty/Experts General Attitude Towards Digital Library Education and Training in India

(Total Resp. = 80)

S. No.	Statement	SA	AG	NE	DS	SD
4.1.1	Digital library education is in its beginning phase in India.	16	30	23	10	1
		20.00%	37.50%	28.75%	12.50%	1.25%
		CA = 57.50			CD = 13.75%	
4.1.2	Teaching of digital libraries are very essential in LIS curricula.	46	33	0	0	1
		57.50%	41.25%	0.00%	0.00%	1.25%
		CA = 98.75%			CD = 1.25%	
4.1.2	Digital libraries will be sustainable and much demanded in future.	51	22	6	0	1
		63.75%	27.50%	7.50%	0.00%	1.25%
		CA = 91.25%			CD = 1.25%	

4.1.4	Shortage of digital library professionals in India.	21	44	12	1	2
		26.25%	55.00%	15.00%	1.25%	2.50%
		CA = 81.25%		CD = 3.75%		

SA = Strongly Agree; AG = Agree; NE = Neutral; DA = Disagree; SD = Strongly Disagree; CA. = Combined Agreement; CD = Combined Disagreement.

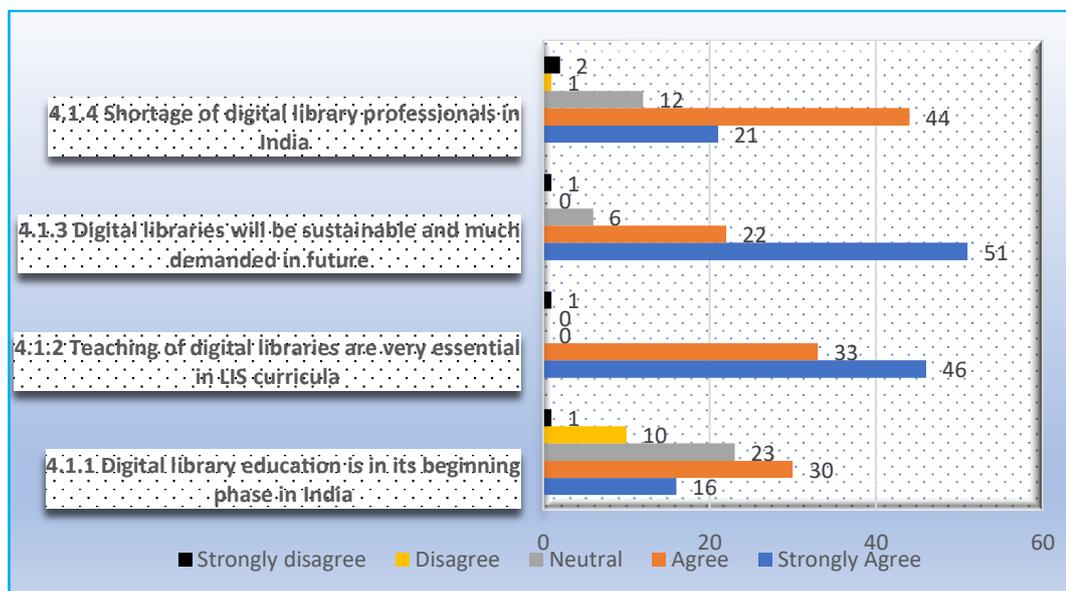


Figure 5.1.9: Geographical Representation of Faculty/Experts General Attitude Towards Digital Library Education and Training in India

5.1.4.2 Faculty/Experts Attitude Towards Infrastructure and Recourses

The below Table 5.1.8 helps in comprehending the faculty / expert’s opinion on available infrastructure and recourses for digital library education and training in the country. They were asked four questions related to infrastructure and recourses for digital library education and training on which they were to agree or disagree. For the purpose of analysis responses in Table 5.1.8 are clubbed into three groups of combined agreement [Strongly Agree (SA) plus Agree (AG)], combined disagreement [Disagree (DS) plus Strongly Disagree (SD)] and Neutral (NE) in percentages for each statement to highlight dilemmas among respondents.

The statement at 4.2.1, i.e., “Lack of building infrastructure with necessary facilities and furniture” has 91.25% respondents in agreement and 6.25% in disagreement while 2.50% were neutral.

The statement at 4.2.2, i.e., “Lack of audio-visual aids (like Projector, Speaker, Mike, Smart board, teaching aids etc.” has 83.75% respondents in agreement and 8.75% in disagreement while 7.50% were neutral.

The statement at 4.2.3, i.e., “Computer labs are not well equipped (availability of adequate number of computers and viable internet connection)” has 82.50% respondents in agreement and 8.75% in disagreement while 8.75% were neutral.

The statement at 3.5.4, i.e., “Sometimes technical problems occur (such as internet bandwidth, power outage, software installation, etc)” has 91.25% respondents in agreement and 2.50% in disagreement while 6.25% were neutral.

Therefore, from table 5.1.8 it can be understood that a majority of the faculty/experts of digital libraries feel that digital library education and training in our county affecting by various issues related to necessary infrastructure and resources like, lack of building infrastructure with necessary facilities and furniture; audio-visual aids (like Projector, Speaker, Mike, Smartboard, teaching aids, etc.; availability of an adequate number of computers and viable internet connection; technical issues of internet bandwidth, power outage, software installation, etc. and. Figure 5.1.10 shows the graphical representation of the same.

Table – 5.1.8: Faculty/Experts Attitude Towards Infrastructure and Recourses

(Total Resp. = 80)

S. No.	Statement	SA	AG	NE	DS	SD
4.2.1	Lack of building infrastructure with necessary facilities and furniture	31	42	2	4	1
		38.75%	52.50%	2.50%	5.00%	1.25%
		CA = 91.25%			CD = 6.25%	
4.2.2	Lack of audio-visual aids (like Projector, Speaker, Mike, Smart board, teaching aids etc.	25	42	6	6	1
		31.25%	52.50%	7.50%	7.50%	1.25%
		CA = 83.75%			CD = 8.75%	
4.2.3	Computer labs are not well equipped (availability of adequate number of computers	26	40	7	6	1
		32.50%	50.00%	8.75%	7.50%	1.25%
		CA = 82.50%			CD = 8.75%	

	and viable internet connection)					
4.2.4	Sometimes technical problems occur (like such as internet bandwidth, power outage, software installation, etc)	31	42	5	1	1
		38.75%	52.50%	6.25%	1.25%	1.25%
		CA = 91.25%			CD = 2.50%	

SA = Strongly Agree; AG = Agree; NE = Neutral; DA = Disagree; SD = Strongly Disagree; CA. = Combined Agreement; CD = Combined Disagreement.

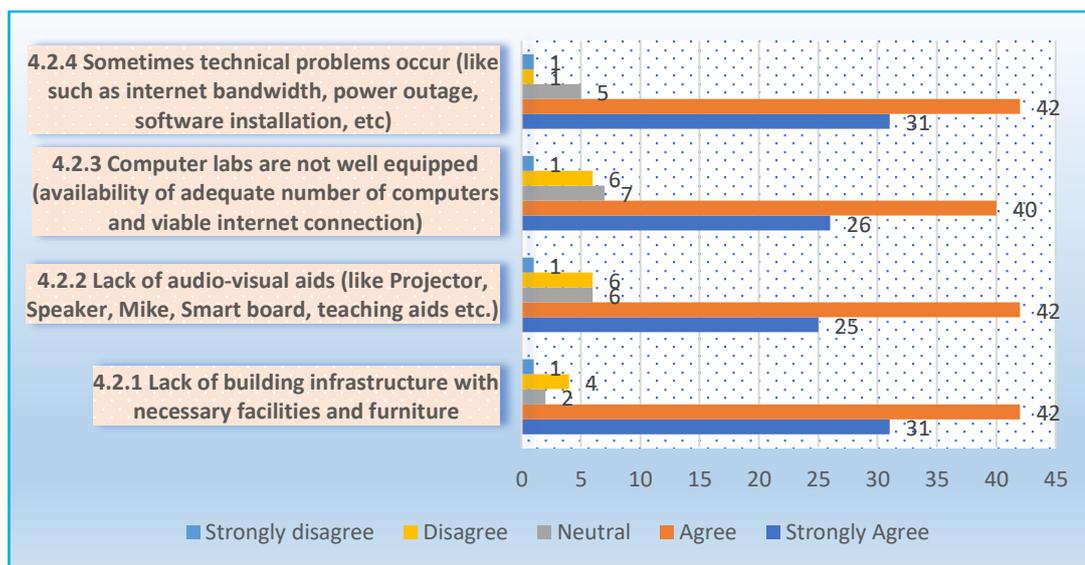


Figure 5.1.10: Graphical Representation of Faculty/Experts Attitude Towards Infrastructure and Recourses

5.1.4.3 Faculty / Experts Attitude Towards Students / Learners Issues

An analysis of the data in Table 5.1.9 shows that faculty / experts of digital libraries attitude towards students/learners issues. They were asked five questions related to students / learners' issues on which they were to agree or disagree. For the purpose of analysis responses in Table 5.1.9 are clubbed into three groups of combined agreement [Strongly Agree (SA) plus Agree (AG)], combined disagreement [Disagree (DS) plus Strongly Disagree (SD)] and Neutral (NE) in percentages for each statement to highlight dilemmas among groups of respondents.

The statement at 4.3.1, i.e., “Students / learners have lack of awareness about digital library education and training opportunities” has 82.50% respondents in agreement and 7.50% in disagreement while 10.00% were neutral. It shows that most of students

were not aware about digital library education and training opportunities in the country.

The statement at 4.3.2, i.e., *“Lack of enough enrolment in the training / courses”* has 72.50% respondents in agreement and 13.75% in disagreement while 13.75% were neutral. Majority of respondents that enrolment of the students or participants were very few in digital library courses/programmes.

The statement at 4.3.3, i.e., *“Students / learners afraid from computer operating /digital library technologies”* has 57.50% respondents in agreement and 26.25% in disagreement while 16.25% were neutral. From this statement that sometimes faculty / experts noticed that students / learners have learners afraid from computer operating /digital library technologies.

The statement at 4.3.4, i.e., *“Language is a barrier for understanding digital libraries to students / learners”* has 67.50% respondents in agreement and 18.75% in disagreement while 13.75% were neutral. It is clear that language is big challenges in communication between faculty and students / learners also during digital library education and training in the country.

Whereas, the statement at 4.3.5, i.e., *“Students / learners have lack of interaction and communication skills”* has 73.75% respondents in agreement and 13.75% in disagreement while 12.50% were neutral. It shows that students / learners of digital library have lack of interaction and communication skills.

Hence, from table 5.1.9 a good majority of the faculty /experts of digital library agree with different issues of students / learners during the digital library education and training. Figure 5.1.11 shows the graphical representation of the same.

Table – 5.1.9: Faculty/Experts Attitude Towards Students/Learners Issues

(Total Resp. = 80)

S. No.	Statement	SA	AG	NE	DS	SD
4.3.1	Students / learners have lack of awareness about digital library	22	44	8	5	1
		27.50%	55.00%	10.00%	6.25%	1.25%
		CA = 82.50%			CD = 7.50%	

	education and training opportunities					
4.3.2	Lack of enough enrolment in the training / courses	16	42	11	7	4
		20.00%	52.50%	13.75%	8.75%	5.00%
		CA = 72.50%			CD = 13.75%	
4.3.3	Students / learners afraid from computer operating /digital library technologies	11	35	13	19	2
		13.75%	43.75%	16.25%	23.75%	2.50%
		CA = 57.50%			CD = 26.25%	
4.3.4	Language is a barrier for understanding digital libraries to students / learners	20	34	11	13	2
		25.00%	42.50%	13.75%	16.25%	2.50%
		CA = 67.50%			CD = 18.75%	
4.3.5	Students / learners have lack of interaction and communication skills	15	44	10	9	2
		18.75%	55.00%	12.50%	11.25%	2.50%
		CA = 73.75%			CD = 13.75%	

SA = Strongly Agree; AG = Agree; NE = Neutral; DA = Disagree; SD = Strongly Disagree; CA. = Combined Agreement; CD = Combined Disagreement.

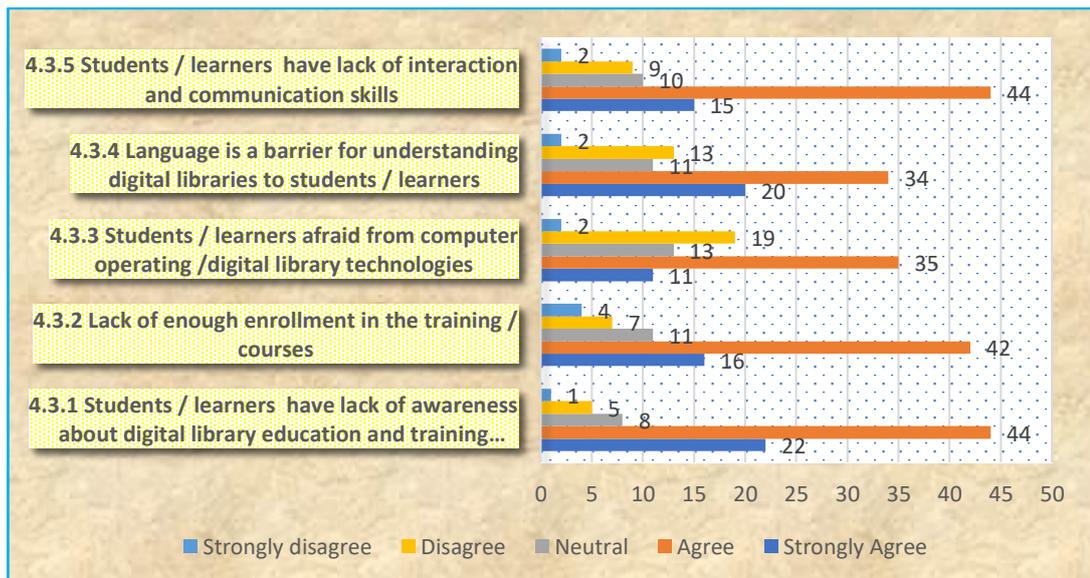


Figure 5.1.11: Graphical Representation of Faculty/Experts Attitude Towards Students/Learners Issues

5.1.4.4 Faculty/Experts Attitude Towards Administration, Accreditation and Financial Issues

The below table 5.1.10 helps in comprehending various issues administration, accreditation and financial issues of digital library education and training in the country in context of faculty/ experts of digital library. They were asked five questions related to implementation of digital libraries on which they were to agree or disagree. For the purpose of analysis responses in Table 5.1.10 are clubbed into three groups of combined agreement [Strongly Agree (SA) plus Agree (AG)], combined disagreement [Disagree (DS) plus Strongly Disagree (SD)] and Neutral (NE) in percentages for each statement to highlight dilemmas among respondents.

The statement at 4.4.1, i.e., *“Lack of administration /institutional support for promoting and initiating digital library education and training”* has 81.25% respondents in agreement and 5.00% in disagreement while 13.75% were neutral.

The statement at 4.4.2, i.e., *“Lack of active role of higher education agencies (MHRD, UGC, DEB, NAAC, etc.) in curriculum development and accreditation for digital library education and training”* has 65.00% respondents in agreement and 15.00% in disagreement while 20.00% were neutral.

The statement at 4.4.3, i.e., *“Lack of collaboration between LIS schools at National and International level for digital library education and training”* has 80.00% respondents in agreement and 5.00% in disagreement while 15.00% were neutral.

The statement at 4.4.4, i.e., *“No awards/ rewards for good performance, excellent efforts or initiatives”* has 67.50% respondents in agreement and 10.00% in disagreement while 22.50% were neutral.

The statement at 4.4.5, i.e., *“Lack of Funding opportunities (Inadequate financial support from the sponsoring bodies)”* has 78.75% respondents in agreement and 8.75% in disagreement while 12.50% were neutral.

Therefore, from the table 5.1.10 it can be understood that a majority of the faculty / experts of digital libraries were faced various issues related administration, accreditation and financial for conducting digital library education and training in the country. Figure 5.1.12 shows the graphical representation of the same.

Table – 5.1.10: Faculty / Experts Attitude Towards Administration, Accreditation and Financial Issues

(Total Resp. = 80)

S. No.	Statement	SA	AG	NE	DS	SD
4.4.1	Lack of administration /institutional support for promoting and initiating digital library education and training	25	40	11	3	1
		31.25 %	50.00 %	13.75 %	3.75 %	1.25%
		CA = 81.25%			CD = 5.00%	
4.4.2	Lack of active role of higher education agencies (MHRD, UGC, DEB, NAAC, etc.) in curriculum development and accreditation for digital library education and training	17	35	16	10	2
		21.25 %	43.75 %	20.00 %	12.50 %	2.50%
		CA = 65.00%			CD = 15.00%	
4.4.3	Lack of collaboration between LIS schools at National and International level for digital library education and training	17	47	12	3	1
		21.25 %	58.75 %	15.00 %	3.75 %	1.25%
		CA = 80.00%			CD = 5.00%	
4.4.4	No awards/ rewards for good performance, excellent efforts or initiatives	16	38	18	6	2
		20.00 %	47.50 %	22.50 %	7.50 %	2.50%
		CA = 67.50%			CD = 10.00%	
4.4.5	Lack of Funding opportunities (Inadequate financial support from the sponsoring bodies)	27	36	10	4	3
		33.75 %	45.00 %	12.50 %	5.00 %	3.75%
		CA = 78.75%			CD = 8.75%	

SA = Strongly Agree; AG = Agree; NE = Neutral; DA = Disagree; SD = Strongly Disagree; CA. = Combined Agreement; CD = Combined Disagreement.

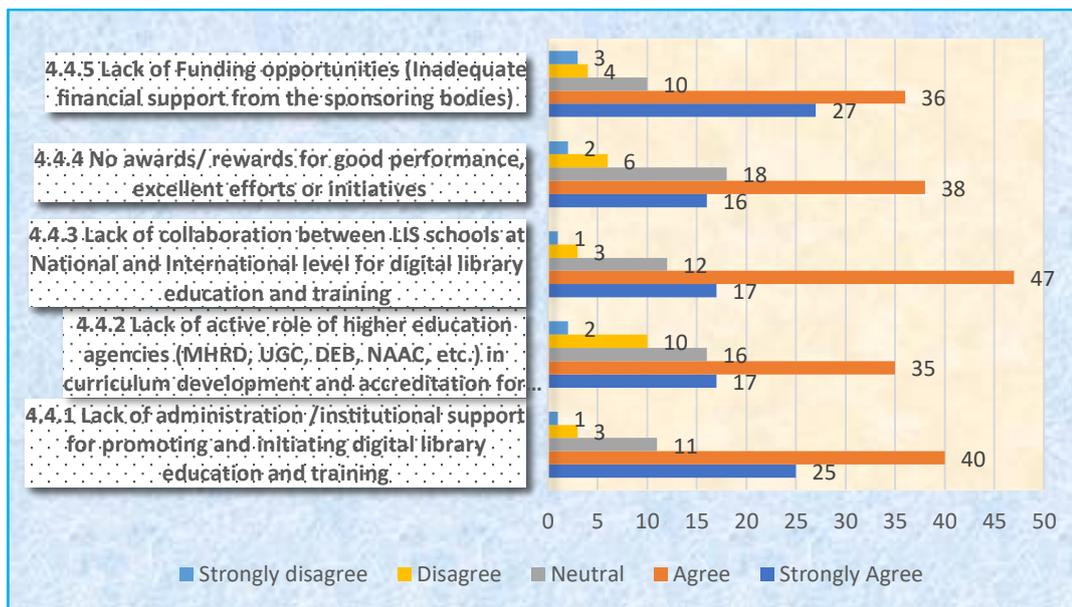


Figure 5.1.12: Graphical Representation of Faculty/Experts Attitude Towards Administration, Accreditation and Financial Issues

5.1.4.5 Faculty / Experts Attitude Towards Study and Learning Material of Digital Library

An analysis of the data in Table 5.1.11 shows regarding faculty/expert’s opinions in regard to the study and learning material of the digital library. They were asked four questions related to study and learning material of digital library on which they were to agree or disagree. For the purpose of analysis responses in Table 5.1.11 are clubbed into three groups of combined agreement [Strongly Agree (SA) plus Agree (AG)], combined disagreement [Disagree (DS) plus Strongly Disagree (SD)] and Neutral (NE) in percentages for each statement to highlight dilemmas among groups of professionals.

The statement at **4.5.1**, i.e., “*Lack of teaching material and courses for teachers in the fields of digital libraries*” has 61.25% respondents in agreement and 20.00% in disagreement while 18.75% were neutral.

The statement at **4.5.2**, i.e., “*Course content on the digital library having less quality in terms of accuracy, understanding, and reading*” has 60.00% respondents in agreement and 15.00% in disagreement while 25.00% were neutral.

The statement at **4.5.3**, i.e., “Lack of enough content in indigenous languages on digital libraries” has 81.25% respondents in agreement and 3.75% in disagreement while 15.00% were neutral.

The statement at **4.5.4**, i.e., “Lack of research in digital libraries in India” has 71.25% respondents in agreement and 13.75% in disagreement while 15.00% were neutral.

Hence, from table 5.1.11 it is clear that a majority of the faculty/ experts of digital libraries agree upon the questions regarding lack of teaching material; lack of course content in terms of quality and its availability in indigenous language. The majority of respondents agreed that still, research on digital libraries in India has been very less. Figure 5.1.13 shows the graphical representation of the same.

Table – 5.1.11: Faculty / Experts Attitude Towards Study and Learning Material of Digital Library

(Total Resp. = 80)

S. No.	Statement	SA	AG	NE	DS	SD
4.5.1	Lack of teaching material and courses for teachers in the fields of digital libraries	11	38	15	15	1
		13.75 %	47.50 %	18.75 %	18.75 %	1.25%
		CA = 61.25%			CD = 20.00%	
4.5.2	Course content on the digital library having less quality in terms of accuracy, understanding, and reading	14	34	20	11	1
		17.50 %	42.50 %	25.00 %	13.75 %	1.25%
		CA = 60.00%			CD = 15.00%	
4.5.3	Lack of enough content in indigenous languages on digital libraries	21	44	12	2	1
		26.25 %	55.00 %	15.00 %	2.50%	1.25%
		CA = 81.25%			CD = 3.75%	
4.5.4	Lack of research in digital libraries in India	20	37	12	9	2
		25.00 %	46.25 %	15.00 %	11.25 %	2.50%
		CA = 71.25%			CD = 13.75%	

SA = Strongly Agree; AG = Agree; NE = Neutral; DA = Disagree; SD = Strongly Disagree; CA. = Combined Agreement; CD = Combined Disagreement.

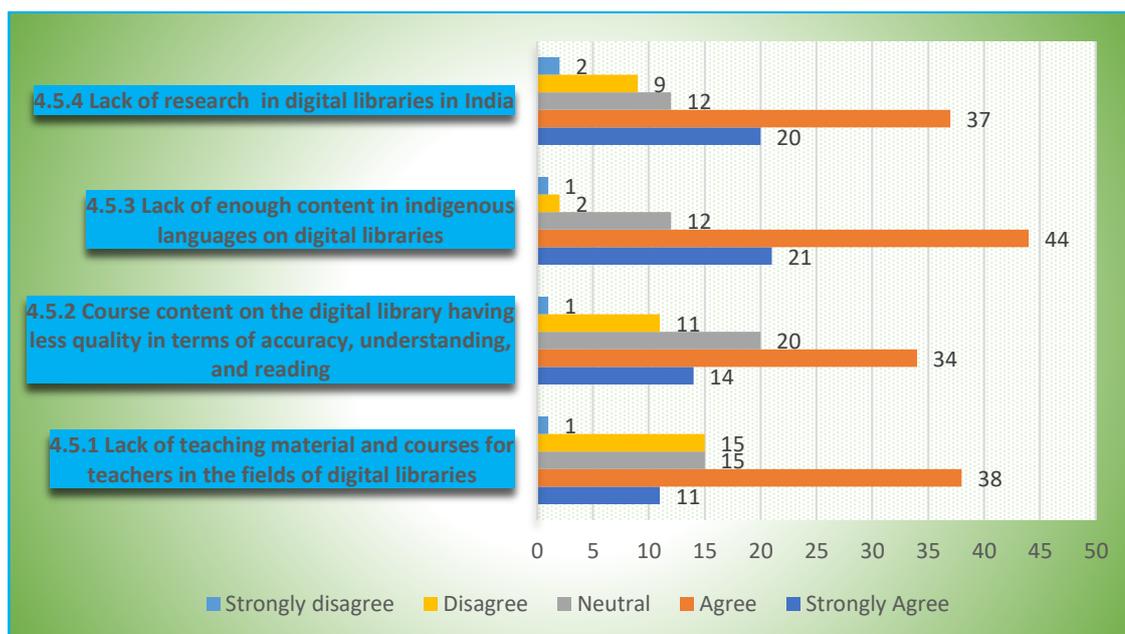


Figure 5.1.13: Graphical Representation of Faculty/Experts Attitude Towards Study and Learning Material of Digital Library

5.1.4.6 Faculty / Experts Attitude Towards Human Resources for Digital Library Education and Training

The below table 5.1.12 helps in grasping the various aspects related to human resources for digital library education and training in India. Faculty/ experts were asked four questions related to human resources for digital library education and training on which they were to agree or disagree. For the purpose of analysis responses in Table 5.1.12 are clubbed into three groups of combined agreement [Strongly Agree (SA) plus Agree (AG)], combined disagreement [Disagree (DS) plus Strongly Disagree (SD)] and Neutral (NE) in percentages for each statement to highlight different opinions of the respondents on the asked questions.

The statement at 4.6.1, i.e., “*Shortage of trained, competent and committed faculty (experts/trainers)*” has 81.25% respondents in agreement and 7.50% in disagreement while 11.25% were neutral.

The statement at 4.6.2, i.e., “*Lack of technical support staff for digital libraries*” has 85.00% respondents in agreement and 10.00% in disagreement while 5.00% were neutral.

The statement at 4.6.3, i.e., “*Lack of their research skills in digital libraries*” has 77.50% respondents in agreement and 10.00% in disagreement while 12.50% were neutral.

The statement at 4.6.4, i.e., “*Lack of exchange of expertise and experience for digital library education and training*” has 80.00% respondents in agreement and 10.00% in disagreement while 10.00% were neutral.

Therefore, from the table 5.1.12 it can be understood that a majority of the respondents agreed regarding shortage of competent, skilled and trained human resource or training / technical staff for digital library education and training in the country. It is also clear from last statement that majority of respondents were agreed exchanging of expertise and experience of digital libraries were not properly exchanging in the county. Figure 5.1.14 shows the graphical representation of the same.

Table – 5.1.12: Faculty/Experts Attitude Towards Human Resources

(Total Resp. = 80)

S. No.	Statement	SA	AG	NE	DS	SD
4.6.1	Shortage of trained, competent and committed faculty (experts/trainers)	22	43	9	5	1
		27.50%	53.75%	11.25%	6.25%	1.25%
		CA = 81.25%			CD = 7.50%	
4.6.2	Lack of technical support staff for digital libraries	24	44	4	7	1
		30.00%	55.00%	5.00%	8.75%	1.25%
		CA = 85.00%			CD = 10.00%	
4.6.3	Lack of their research skills in digital libraries	22	40	10	7	1
		27.50%	50.00%	12.50%	8.75%	1.25%
		CA = 77.50%			CD = 10.00%	
4.6.4	Lack of exchange of expertise and experience for digital library education and training	19	45	8	6	2
		23.75%	56.25%	10.00%	7.50%	2.50%
		CA = 80.00%			CD = 10.00%	

SA = Strongly Agree; AG = Agree; NE = Neutral; DA = Disagree; SD = Strongly Disagree; CA. = Combined Agreement; CD = Combined Disagreement.

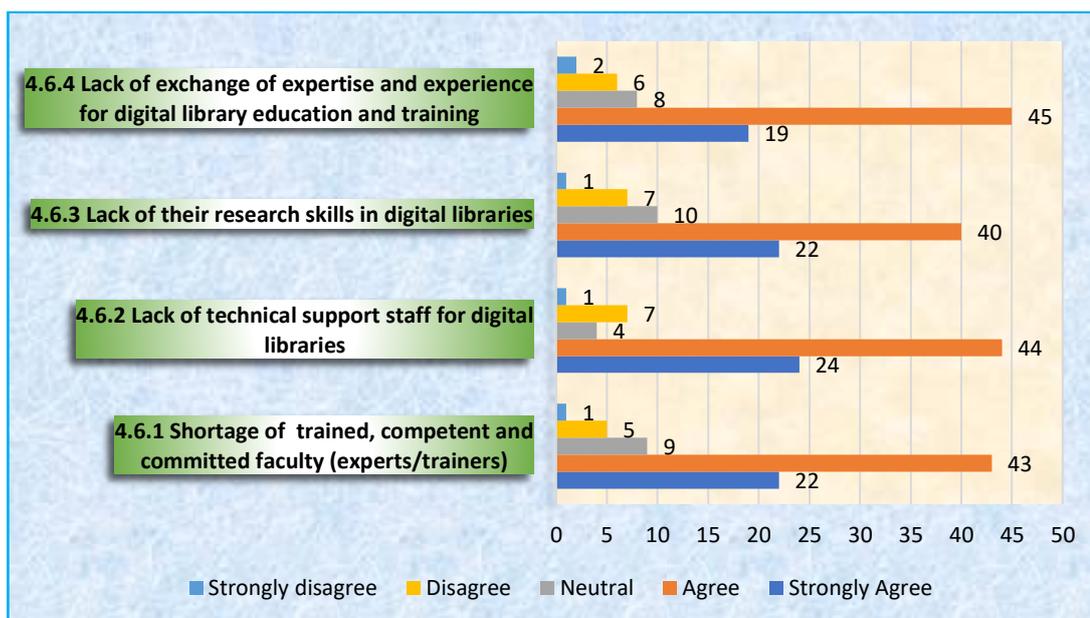


Figure 5.1.14: Graphical Representation of Faculty/Expert’s Attitude Towards Human Resources

5.1.4.7 Faculty / Experts Attitude Towards Self-Motivation and Personal Issues

The below Table 5.1.13 helps in comprehending the personal issues of faculty/experts to conducting digital library education and training programmes. They were asked four questions related to their personal issues on which they were to agree or disagree. For the purpose of analysis responses in Table 5.1.13 are clubbed into three groups of combined agreement [Strongly Agree (SA) plus Agree (AG)], combined disagreement [Disagree (DS) plus Strongly Disagree (SD)] and Neutral (NE) in percentages for each statement to highlight dilemmas among respondents.

The statement at 4.7.1, i.e., “*Lack of time for planning for initiating digital library education and training*” has 65.00% respondents in agreement and 13.75% in disagreement while 21.25% were neutral.

The statement at 4.7.2, i.e., “*Lack of self-expertise in digital libraries*” has 60.00% respondents in agreement and 11.25% in disagreement while 28.75% were neutral.

The statement at 4.7.3, i.e., “*Realizing lack of update-ness in digital libraries*” has 65.00% respondents in agreement and 8.75% in disagreement while 26.25% were neutral.

The statement at 4.7.4, i.e., “*Inability to express ideas or difficulties*” has 53.75% respondents in agreement and 16.25% in disagreement while 30.00% were neutral.

The statement at 4.7.5, i.e., “*Lack of teaching interest in digital libraries*” has 36.25% respondents in agreement and 25.00% in disagreement while majority of respondents, i.e., 38.75% were neutral with this statement.

Therefore, from the table 5.1.13 it can be understood that a majority of the faculty / experts of digital libraries having their different self-motivational and personal issues that barrier in conducting digital library education and training programs. Figure 5.1.15 shows the graphical representation of the same.

Table – 5.1.13: Faculty / Experts Attitude Towards Self-Motivation and Personal Issues

(Total Resp. = 80)

S. No.	Statement	SA	AG	NE	DS	SD
4.7.1	Lack of time for planning for initiating digital library education and training	11	41	17	9	2
		13.75%	51.25%	21.25%	11.25%	2.50%
		CA = 65.00%			CD = 13.75%	
4.7.2	Lack of self-expertise in digital libraries	12	36	23	8	1
		15.00%	45.00%	28.75%	10.00%	1.25%
		CA = 60.00%			CD = 11.25%	
4.7.3	Realizing lack of update-ness in digital libraries	14	38	21	6	1
		17.50%	47.50%	26.25%	7.50%	1.25%
		CA = 65.00%			CD = 8.75%	
4.7.4	Inability to express ideas or difficulties	10	33	24	12	1
		12.50%	41.25%	30.00%	15.00%	1.25%
		CA = 53.75%			CD = 16.25%	

4.7.5	Lack of teaching interest in digital libraries	10	19	31	17	3
		12.50%	23.75%	38.75%	21.25%	3.75%
		CA =36.25%			CD =25.00%	

SA = Strongly Agree; AG =Agree; NE = Neutral; DA = Disagree; SD = Strongly Disagree; CA. = Combined Agreement; CD = Combined Disagreement.

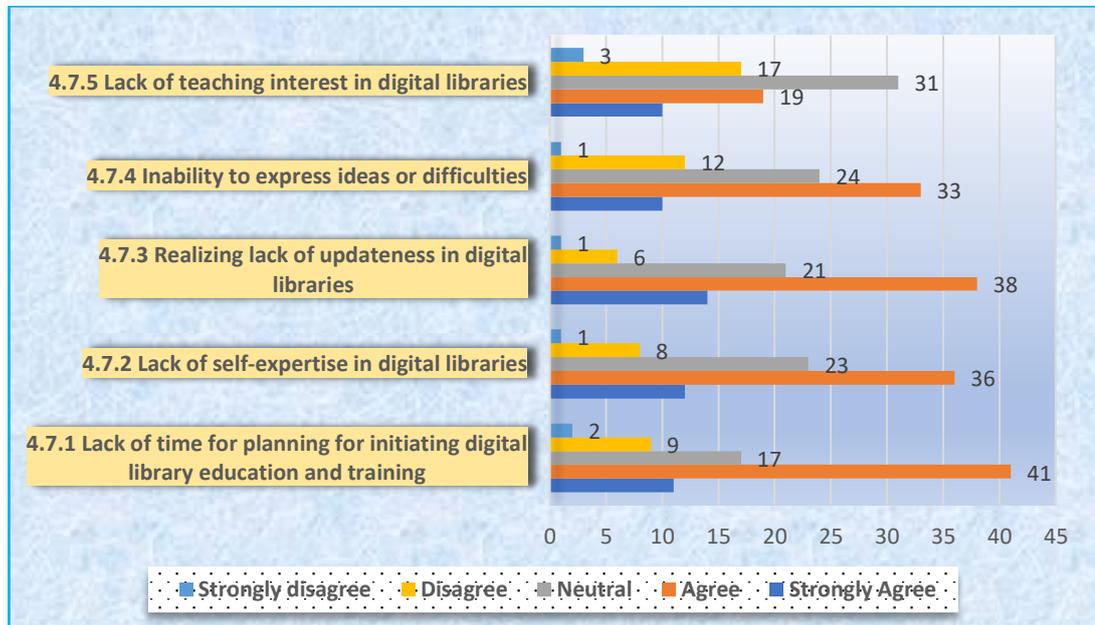


Figure 5.1.15: Graphical Representation of Faculty/Experts Attitude Towards Self-Motivation and Personal Issues

5.1.4.8 Different Types of Teaching Methods for Digital Library Education and Training

Teachers use different methods in taking classes or training sessions. Table 5.1.14 shows the teaching methods used by faculty/ experts during digital library education and training. Majority of 78 (i.e., 97.50%) respondents gave higher preference to the demonstration method. 50 (62.50%) agreed with the classroom discussion method; 46 (i.e., 57.50%) agreed with the lecture method. Below to 50%, respondents agreed with the assignment method; seminar method; question-answer method, and other methods as they mentioned like hands-on practice, classroom teaching, and practices for teaching and training of digital libraries. Figure 5.1.16 shows the graphical representation of the same.

Table – 5.1.14: Different Types of Teaching Methods for Digital Library Education and Training

S. No.	Teaching Methods	Frequency	Percent	Rank	Total number of respondents
1	Demonstration Method	78	97.50%	1	80
2	Classroom Discussion Method	50	62.50%	2	80
3	Lecture Method	46	57.50%	3	80
4	Assignment Method	30	37.50%	4	80
5	Seminar Method	27	33.75%	5	80
6	Question-Answer Method	24	30.00%	6	80
7	Other	4	5.00%	7	80

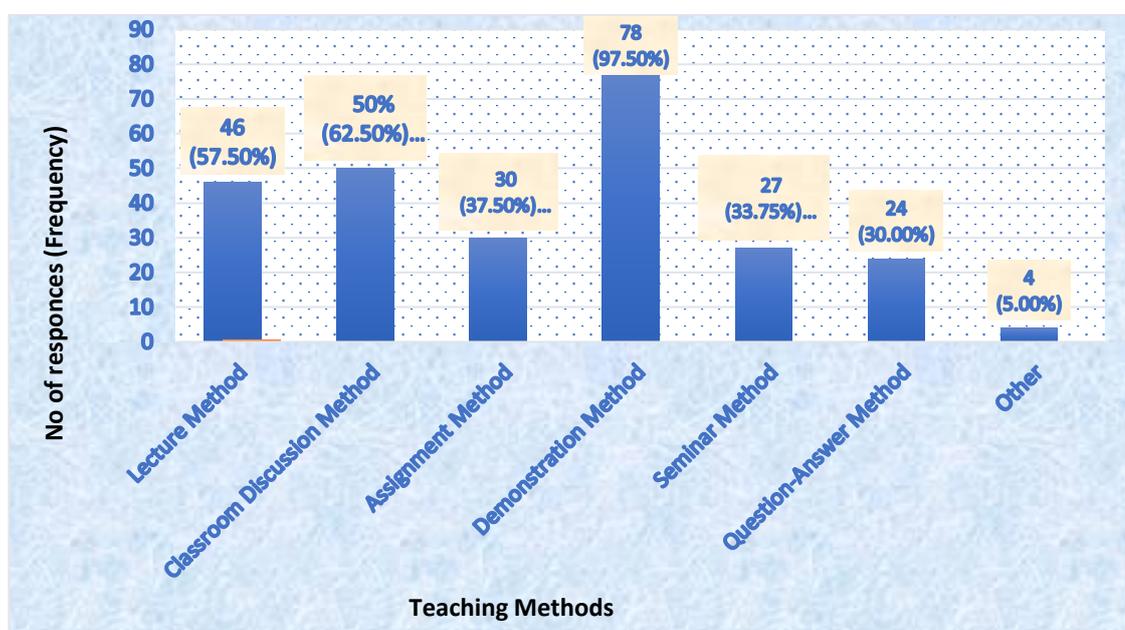


Figure 5.1.16: Graphical Representation of Different Types of Teaching Methods for Digital Library Education and Training

5.1.4.9 Faculty/Experts Attitude Towards Evaluation Patterns According to Changing Trends

Evaluation is a very important part of any education and training. Without evaluation, it cannot find out the final result of the education and training. In the context of changing trends of digital library education and training, different types of evaluation patterns have been mentioned in Table 5.1.15. Faculty/experts of digital libraries were asked four questions related to different evaluation patterns according to changing

trends on which they were to agree or disagree. For the purpose of analysis responses in Table 5.1.15 are clubbed into three groups of combined agreement [Strongly Agree (SA) plus Agree (AG)], combined disagreement [Disagree (DS) plus Strongly Disagree (SD)] and Neutral (NE) in percentages for each statement to highlight dilemmas among groups of respondents.

The statement at 4.9.1, i.e., “*Written exam should be taken as a system of testing and evaluating the students/ learner’s achievement*” has 80.00% respondents in agreement and 10.00% in disagreement while 10.00% were neutral.

The statement at 4.9.2, i.e., “*Hands-on practical test taken as a system of testing and evaluating the students/learner’s achievement*” has 97.50% respondents in agreement and 1.25% in disagreement while 1.25% were neutral.

The statement at 4.9.3, i.e., “*Oral exam should be taken as a system of testing and evaluating the students/learner’s achievement*” has 75.00% respondents in agreement and 8.75% in disagreement while 16.25% were neutral.

The statement at 4.9.4, i.e., “*Assignment should be given for testing and evaluating the students/learner’s achievement*” has 87.50% respondents in agreement and 3.75% in disagreement while 8.75% were neutral.

Hence, from table 5.1.15 it is clear that a majority of the respondents agreed with the asked statements about acceptance of different types of evaluation patterns, i.e., written exam; hands-on practical; oral exam; assignments that should be used as a system of testing and evaluating the students/ learner’s achievement. However, 97.50% of respondents very much agreed with the hands-on practical test to opting as a system of testing and evaluating the students/ learner’s achievement. Figure 5.1.17 shows the graphical representation of the same.

Table – 5.1.15: Faculty / Experts Attitude Towards Evaluation Patterns According to Changing Trends

(Total Resp. = 80)

S. No.	Statement	SA	AG	NE	DS	SD
4.9.1	Written exam should be taken as a system of testing and evaluating the students/ learner’s achievement	21	43	8	6	2
		26.25 %	53.75 %	10.00 %	7.50%	2.50%

		CA = 80.00%			CD = 10.00%	
4.9.2	Hands-on practical test taken as a system of testing and evaluating the students/learner's achievement	48	30	1	0	1
		60.00 %	37.50 %	1.25%	0.00%	1.25%
		CA = 97.50%			CD = 1.25%	
4.9.3	Oral exam should be taken as a system of testing and evaluating the students/learner's achievement	17	43	13	3	4
		21.25 %	53.75 %	16.25 %	3.75%	5.00%
		CA = 75.00%			CD = 8.75%	
4.9.4	Assignments should be given for testing and evaluating the students/learner's achievement	24	46	7	0	3
		30.00 %	57.50 %	8.75%	0.00%	3.75%
		CA = 87.50%			CD = 3.75%	

SA = Strongly Agree; AG = Agree; NE = Neutral; DA = Disagree; SD = Strongly Disagree; CA. = Combined Agreement; CD = Combined Disagreement.

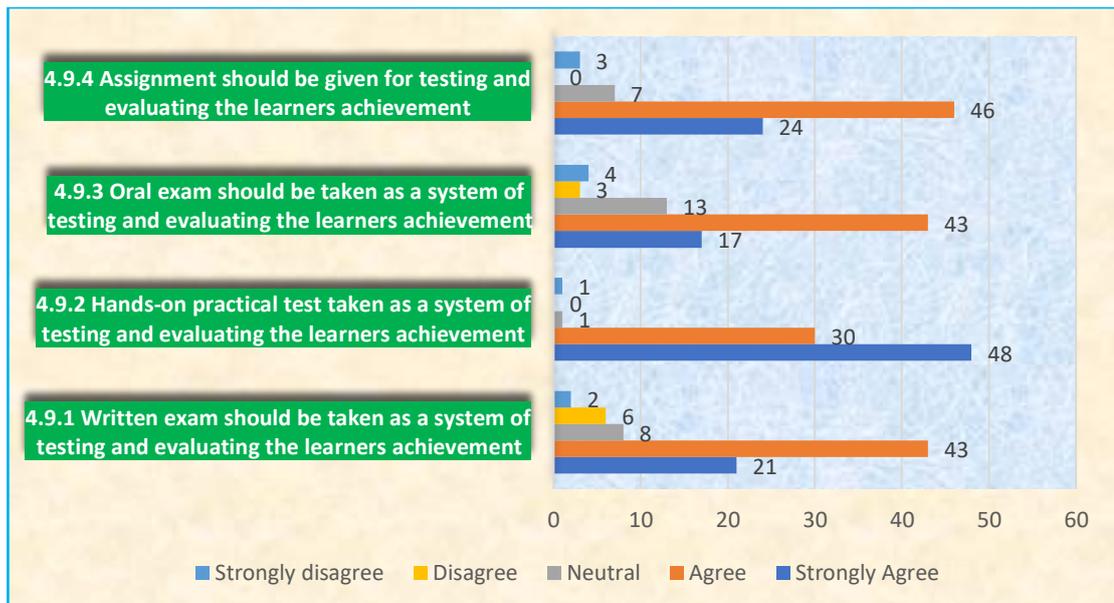


Figure 5.1.17: Graphical Representation of Faculty/Experts Attitude Towards Evaluation and Changing Trends

5.1.4.10 Faculty/Experts Attitude Towards Changing Educational and Training Trends

The below Table 5.1.16 helps in grasping the various aspects related to changing educational and training trends of digital libraries in India from faculty/experts' point of view. Respondents were asked five questions related to changing educational and training trends of digital libraries on which they were to agree or disagree. For the purpose of analysis responses in Table 5.1.16 are clubbed into three groups of combined agreement [Strongly Agree (SA) plus Agree (AG)], combined disagreement [Disagree (DS) plus Strongly Disagree (SD)] and Neutral (NE) in percentages for each statement to highlight different opinions of the respondents on the asked questions.

The statement at 4.10.1, i.e., “*LIS curricula should be changed with rich content of digital libraries*” has 93.75% respondents in agreement and 2.50% in disagreement while 3.75% were neutral.

The statement at 4.10.2, i.e., “*Massive Open Online Courses (MOOCs) will replace traditional teaching system for digital libraries in near future*” has 67.50% respondents in agreement and 17.50% in disagreement while 15.00% were neutral.

The statement at 4.10.3, i.e., “*Opportunities of continuing educational programme (such as: seminar, workshop, conference, short-training courses) in digital libraries should be more*” has 88.75% respondents in agreement and 3.75% in disagreement while 7.50% were neutral.

The statement at 4.10.4, i.e., “*LIS schools should make courses and resources consistent with the needs and expectations of the job market*” has 95.00% respondents in agreement and 2.50% in disagreement while 2.50% were neutral.

Therefore, from the table 5.1.16 it can be understood that a majority of the respondents agreed with asked statements regarding changing educational and training trends for effective education and training for digital libraries. Figure 5.1.18 shows the graphical representation of the same.

Table – 5.1.16: Faculty/Experts Attitude Towards Changing Educational and Training Trends

(Total Resp. = 80)

S. No.	Statement	SA	AG	NE	DS	SD
4.10.1	LIS curricula should be change with rich content of digital libraries	38	37	3	1	1
		47.50 %	46.25 %	3.75%	1.25%	1.25%
		CA = 93.75%			CD = 2.50%	
4.10.2	Massive Open Online Courses (MOOCs) will replace traditional teaching system for digital libraries in near future	23	31	12	9	5
		28.75 %	38.75 %	15.00 %	11.25 %	6.25%
		CA = 67.50%			CD = 17.50%	
4.10.3	Opportunities of continuing educational programme (such as: seminar, workshop, conference, short-training courses) in digital libraries should be more	29	42	6	2	1
		36.25 %	52.50 %	7.50%	2.50%	1.25%
		CA = 88.75%			CD = 3.75%	
4.10.4	LIS schools should make courses and resources consistent with the needs and expectations of the job market.	33	43	2	0	2
		41.25 %	53.75 %	2.50%	0.00%	2.50%
		CA = 95.00%			CD = 2.50%	

SA = Strongly Agree; AG = Agree; NE = Neutral; DA = Disagree; SD = Strongly Disagree; CA. = Combined Agreement; CD = Combined Disagreement.

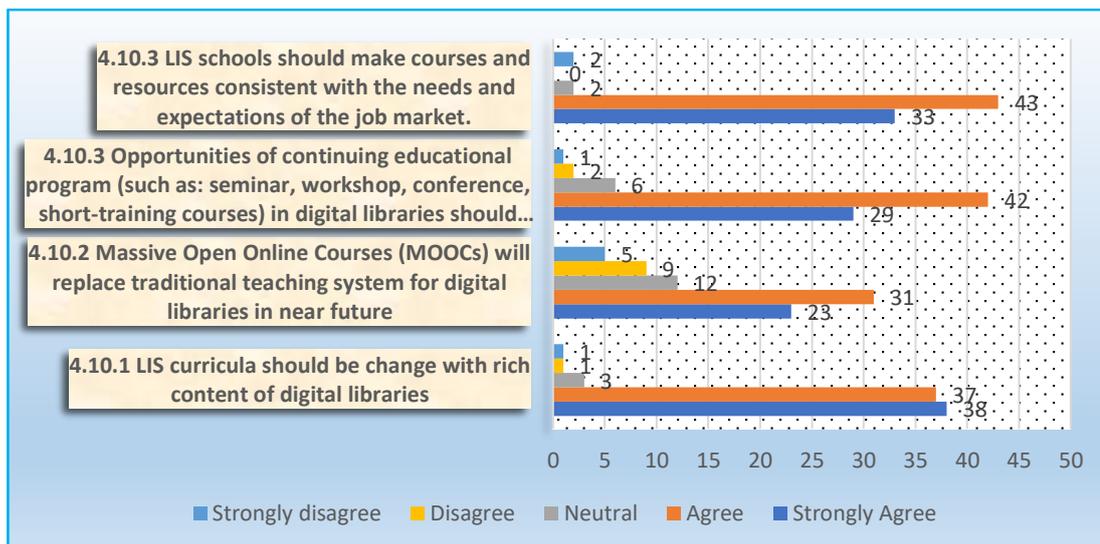


Figure 5.1.18: Graphical Representation of Faculty/Experts Attitude Towards Changing Educational and Training Trends

5.1.4.11 Importance of the Resources for the Purpose of Effective Education and Training on Digital Libraries

An analysis of the data in Table 5.1.17 shows that level of importance of the various resources for the purpose of effective education and training on digital libraries. Faculty/experts were asked to give their opinion on level of importance of different types of resources that how much that resources are important or not important. For the purpose of analysis responses in Table 5.1.17 have been clubbed into four groups of Combined Below to Average Importance (CBAI) = [Not Important at All (NIA) + Of Little Important (OLI)]; Combined Above to Average Important (CAAI) = Very Important (VI) + Absolutely-Important (AI)]; Of Average Important (OAI) in percentages for each statement is mentioned and fourth column shows ranking of resource as per received responses of Combined Above to Average Important (CAAI).

From Combing the responses of ‘Very Important’ (VI) + ‘Absolutely Important’ (AI)], it was perceived that the majority of the faculty/ experts respondents i.e., 82.50% considered “*Course content of digital library in the curriculum at UG/PG level in the University*” as above to average important resource for the purpose of effective education and training on digital libraries followed by “*Open Educational Resources*” opted by 77.50%; “*Continuing training programmes (Workshops/Seminars/Conferences/Short-term training courses)*” opted by 76.25%; “*Training packages/ Guides/Manuals*” opted by 70.00%; “*Massive Open Online*

Courses” (MOOCs) opted by 63.75%; “*Research Journals/proceedings*” opted by 62.50%; “*YouTube Videos*” opted by 61.25%; “*E-Books/Open Archives*” opted by 56.25%; “*Webinars/ Live sessions*” opted by 55.00%; and “*Offline CD/DVDs*” opted only by 31.25%, respectively.

From response on ‘Of Average Important’ (OAI), it was shown that majority of the faculty/experts respondents, i.e., 45.00% considered “*Offline CD/DVDs*” as an average important resource for the purpose of effective education and training on digital libraries followed by “*E-Books/Open Archives*” opted by 25.00%; “*Webinars/ Live sessions*” opted by 22.50%); “*Research Journals/proceedings*” opted by 21.25%; “*YouTube Videos*” opted by 18.75%; “*Massive Open Online Courses*” (MOOCs) opted by 17.50%; “*Training packages/ Guides/Manuals*” opted by 8.75%; both “*Open Educational Resources*” and “*Continuing training programmes (Workshops/Seminars/Conferences/Short-term training courses)*” opted by 6.25%; and “*Course content of digital library in the curriculum at UG/PG level in the University*” opted only by 1.25% respectively.

From Combining the responses of ‘Not Important at All’ (NIA) + ‘Of Little Important’ (OLI)], it was perceived that the majority of the faculty/ experts respondents i.e., 23.75% considered “*Offline CD/DVDs*” as below to average important resource for the purpose of effective education and training on digital libraries, followed by “*Webinars/ Live sessions*” opted by 22.50%; “*Training packages/ Guides/Manuals*” opted by 21.25%; “*YouTube Videos*” opted by 20.00%; both “*Massive Open Online Courses (MOOCs)*” and E- “*Books/Open Archives*” opted by 18.75%; “*Continuing training programmes (Workshops/Seminars/Conferences/Short-term training courses)*” opted by 17.50%; “*Course content of digital library in the curriculum at UG/PG level in the University*”; “*Open Educational Resources*” and “*Research Journals/proceedings*” opted by 16.25%, respectively.

As can be seen from the Table 5.1.17, “*Course content of digital library in the curriculum at UG/PG level in the University*” was ranked first on the bases of combining score (CAAI) of ‘Very Important’ (VI) and ‘Absolutely Important’ (AI) followed by “*Open Educational Resources*”, “*Continuing training programmes (Workshops/Seminars/Conferences/Short-term training courses)*”, “*Training packages/ Guides/Manuals,*” and so on. “*E-Books/Open Archives*”, “*Webinars/ Live*

sessions” and “Offline CD/DVDs” ranked at the bottom of the table (Rank VII to X). Figure 5.1.19 shows the graphical representation of the same.

Table – 5.1.17: Importance of the Resources for the Purpose of Effective Education and Training on Digital Libraries

S. No.	Different resources for education and training of digital libraries	NIA	OLI	OAI	VI	AI	Rank as per CAAI
4.11.1	Course content of digital library in the curriculum at UG/PG level in the University	5	8	1	19	47	I
		(6.25%)	(10.00%)	(1.25%)	(23.75%)	(58.75%)	
		CBAI = 16.25%			CAAI = 82.50%		
4.11.2	Open Educational Resources	6	7	5	32	30	II
		(7.50%)	(8.75%)	(6.25%)	(40.00%)	(37.50%)	
		CBAI = 16.25%			CAAI = 77.50%		
4.11.3	Continuing training programmes (Workshops/Seminars/Conferences/Short-term training courses)	5	9	5	29	32	III
		(6.25%)	(11.25%)	(6.25%)	(36.25%)	(40%)	
		CBAI = 17.50%			CAAI = 76.25%		
4.11.4	Training packages/Guides/Manuals	2	15	7	42	14	IV
		(2.50%)	(18.75%)	(8.75%)	(52.50%)	(17.50%)	
		CBAI = 21.25%			CAAI = 70.00%		
4.11.5	Massive Open Online Courses (MOOCs)	4	11	14	33	18	V
		(5.00%)	(13.75%)	(17.50%)	(41.25%)	(22.50%)	
		CBAI = 18.75%			CAAI = 63.75%		
4.11.6	Research Journals/proceedings	4	9	17	33	17	VI
		(5.00%)	(11.25%)	(21.25%)	(41.25%)	(21.25%)	
		CBAI = 16.25%			CAAI = 62.50%		
4.11.7	YouTube Videos	3	13	15	37	12	VII
		(3.75%)	(16.25%)	(18.75%)	(46.25%)	(15.00%)	
		CBAI = 20.00%			CAAI = 61.25%		
4.11.8	E-Books/Open Archives	4	11	20	30	15	VIII
		(5.00%)	(13.75%)	(25.00%)	(37.50%)	(18.75%)	
		CBAI = 18.75%			CAAI = 56.25%		
4.11.9	Webinars/ Live sessions	4	14	18	30	14	IX
		(5.00%)	(17.50%)	(22.50%)	(37.50%)	(17.50%)	
		CBAI = 22.50%			CAAI = 55.00%		
4.11.10	Offline CD/DVDs	8	11	36	17	8	X
		(10.00%)	(13.75%)	(45.00%)	(21.25%)	(10.00%)	
		CBAI = 23.75%			CAAI = 31.25%		

NIA = Not Important at All; **OLI** = Of Little Important; **OAI** = Of Average Important; **VI** = Very Important; **AI** = Absolutely-Important; **CBAI** = Combined Below to Average Important; **CAAI** = Combined Above to Average Important

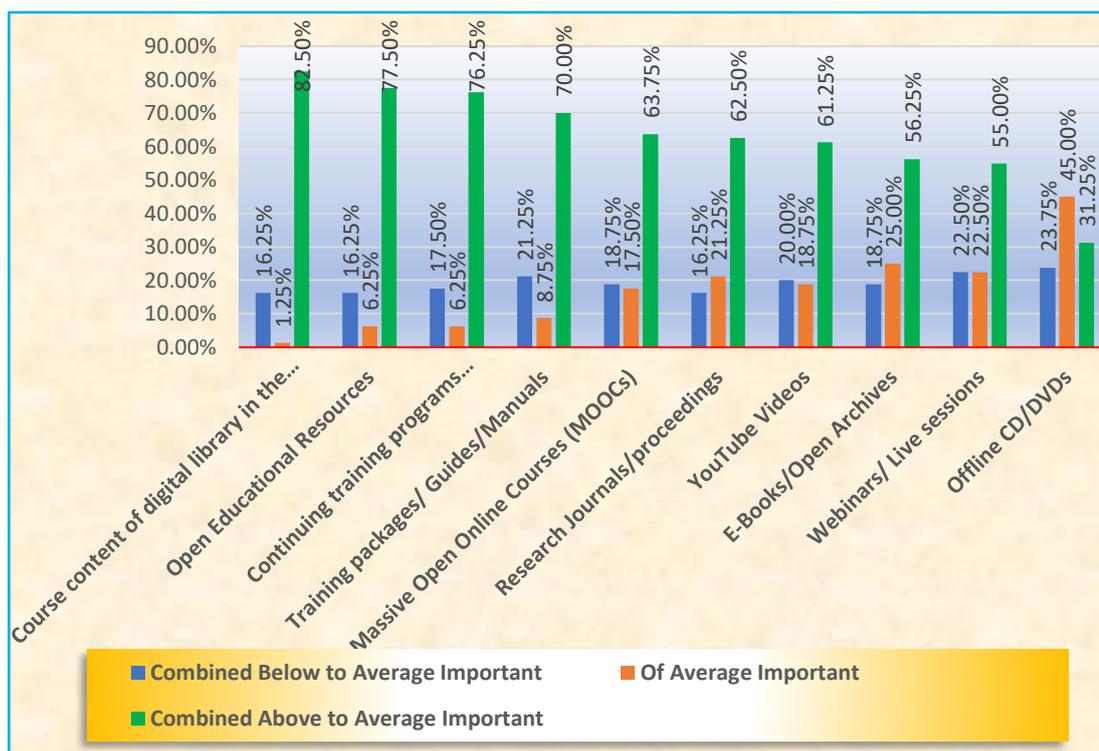


Figure 5.1.19: Graphical Representation of Importance of the Resources of Education and Training

Further, the respondents were asked to mention if any other resources, which can be incorporated for effective education and training for digital libraries. The respondents mentioned some other useful resources as bellow:

- *Blogs, Websites etc.*
- *Working with user friendly system administration.*
- *Handbooks*
- *Module wise Video/Audio clippings and Practical Flow Charts*
- *Consortium*

5.1.4.12 Faculty/ Experts Overall Comments about Education and Training for Digital Libraries in Country

There are many issues, which have been faced by faculty / experts during their teaching of digital libraries. In order to know, their overall comment about education and

training for digital libraries in the country, a descriptive question was asked. The responses received varied and summarized below:

- *Availability of wide range of contents.*
- *Challenges should be overcome*
- *Course content should be updated according to development in ICT*
- *Create awareness to the people about digital library*
- *Curriculum should always be designed by consulting all stakeholders, which in practice, is either not existing or being followed as a ritual.*
- *Digital Libraries education and training in the country is challenged due to financial and unwillingness of the institution authority, if they are agreeing the challenges become opportunities.*
- *Digital libraries have been around for a long time now. Still library professionals are not equipped with their proper training.*
- *Improving technology training*
- *inadequate infrastructure is the main problem*
- *India suffers due to disparities across geographic region and political -social status that affects in building good digital libraries in every institute*
- *Is adequate to meet the challenges and future developments*
- *It is the need of the hour for the professionals to hone up their skills in this direction.*
- *Lack of Infrastructure and skilled manpower is the main hurdle.*
- *Language and lack of adequate infrastructure facilities are the barriers.*
- *Many opportunities available*
- *Many universities have included courses on digital libraries in their curriculum. Giving too much importance to digital libraries in PG courses will hamper other areas*
- *More content should be incorporated into the syllabi of MLIS curriculum.*
- *Most libraries have outsourced the maintenance of their digital libraries and repositories.*
- *Need more practice and training to the students and faculty.*
- *Need to improvement.*
- *Need you conduct more and more training and method od these training should be practical oriented*

- *Needs of hour, practical training sessions and policy for adoption of digitization in day-to-day practices in Library and Information Centres and Library and Information Science Teaching and Learning.*
- *Needs to strengthen*
- *New techniques to be focused*
- *Not up to the mark, needs more specialized curriculum and trained faculty.*
- *Organize refresher course*
- *Provide more practical exposure, More focus on Leadership, Management, Communication, LIS professional and Computer technical skills etc.*
- *The digital library education should be proper. From teaching of basics about e content to proper hands-on training in particular software.*
- *The LIS professionals must be updated with their technological skills and knowledge so as to cope up with the time and can provide the best services to their clientele.*
- *The present scenario is not satisfactory. Teachers should learn more on these aspects and then impart to aspirant librarians.*
- *The promotion and tenure committees/bodies for Library Professionals should have proper marks for installation, updating and maintenance of Digital Library Software.*
- *The teachers should Design, develop, deliver, transact, motivate and engage*
- *There is a tremendous demand of LIS professionals who knows Digital Libraries.*
- *There is very poor grow rate of education and training for digital libraries in the country.*
- *There must be a dedicated paper on digital library (theory and practice both), DLIS university of Jammu has introduced a digital library paper with the forthcoming session in master degree programme.*
- *This has great social impact because it democratizes the dissemination of information. In particular, it will revolutionize the way in which education is conducted and educational materials are prepared. Time will change everything; necessity is mother of invention*
- *Well-designed digital library software has the potential to enable non-specialist people to conceive, assemble, build, and disseminate new information*

5.1.4.13 Faculty/ Experts Suggestions for Betterment of Education and Training on the Digital Library

As a last question, the respondents were asked to give their suggestions for betterment of education and training on the digital library in the country. The responses received from the faculty/ experts for this descriptive question is given below:

- *Adequate infrastructure with proper internet connectivity is required*
- *Be updated with the developments in DL*
- *Beginning level to give it*
- *D L short term programme at every university/college needs to implement.*
- *Digital Library related teaching, research and training infrastructure needs to be strengthened.*
- *DL education requires experts and interested learners.*
- *Every student has different learning skills. So, they required personalize education for digital library. Student oriented education should be encouraged...*
- *Give your suggestions for betterment of education and training on the digital library*
- *Govt. should recruit permanent faculty members for digital library training. Job opportunities are very less in India*
- *Hands on experience and practical knowledge on the active digital libraries*
- *In our department (Gujarat University), we have a separate paper on Digital Information Management where students are trained to use S/W and H/W related to Digital Library with 60 hrs hands-on practice. Myth of the Digital Library should be removed (people are thinking whatever is available on computer are digital) from student's mind. Students should be Digitally Literate from undergraduate level. In the syllabus of Library and Information Science; students should be exposed with digital technology as well as related its hardware and software. Student of LIS should be involved in the creation of Digital content of respective libraries.*
- *In this era Digital Education and Training is must be required.*
- *Individual Activity: Identify topic, Inspire, Current methodology of teaching, how to use information effectively, Constant support/Monitoring*

- *Infrastructure and skilled manpower should be provided to LIS Schools.*
 - *initiate training level more advanced with new modalities*
 - *It should move gradually not overnight*
 - *LIS association should take initiative to improve digital library education and training.*
 - *LIS community should take effective initiative in digital library training and education.*
- Short term training programs should be more....*
- *more attention should be paid regarding hindrances which are being faced in the digitization process*
 - *More focus on practical rather than theoretical perception.*
 - *More practical knowledge should be given and expertise collaboration is required*
 - *More specified training programmes, workshops as per emerging trends and technologies time to time.*
 - *More training courses should be organised by libraries, institutions, and university faculty members.*
 - *It should be a compulsory part of both B. Lib.I. Sc and M.lib. I. Sc.*
 - *Need more practice on practical session.*
 - *Networked based library system*
 - *New techniques to be focused*
 - *No resistance for change*
 - *Policy makers and stakeholders should be encouraged education and training on the digital library in India.*
 - *Quality of content and expertise should be moderate and more approach to words deep learning*
 - *Revision of syllabus, technical staff and digital infrastructure is required.*
 - *Separate Paper on 'Digital Libraries: Concepts and Practices' having both theoretical and practical knowledge' must be included in MLIS*
 - *Should be vibrant and updated as per current scenario*
 - *Special training program/courses should be organized from time to time for digital libraries as done by NISCAIR*
 - *The course based on digital must be focused not only the theory but the practical is mandatory. No doubt in many institutions where the LIS courses*

are offered are providing good number of sources on digital library but there are also many institutions and especially the distance education are going little backward due to many reasons where the foremost reason is the unavailability of the trained teacher on digital library.

- *There should be uniformity in LIS curricula across the country. UGC or professional bodies must initiate in this direction.*
- *There is need of better training of educators and training staff for digital libraries.*
- *To start with one comprehensive credit should be introduced both at Bachelor's and Master's level. Besides full-time course -degree or diploma need to be conducted by the well-established schools of India having adequate infrastructure and manpower skills*
- *UGC should take an initiative, help and support to academic institutions for creating digital library in India*
- *Uniform Curriculum with latest trends and technologies incorporated in the syllabus.*

Faculty Development programmes

- *Update the syllabus with latest developments.*
- *Specialized training courses may enhance the credibility of the respective domain.*

5.2 Survey of Students / Learners of Digital Libraries

The students/learners' questionnaire deals with their opinion regarding different aspects of challenges and opportunities of digital library education and training in India. The questionnaire has been divided into three parts: 1. Demographic Information; 2. Background knowledge and experience, and 3. Attitude of students / learners regarding digital library education and training in India. Received suggestions and overall comments are summarized at the end. Total number of **200 responses** have been analysed here to achieve objective of the study. The analysis was presented below in various sections.

5.2.1 Demographic Information of Students/ Learners

Demography refers to the fundamental and measurable statistics of a population with characteristics such as gender, age, education etc. The figures/tables below will also provide demographic statistics of digital library student/ participant respondents in terms of gender, age, education. The analysis of the data has been done in the following manner:

5.2.1.1 Age Group of Students / Learners

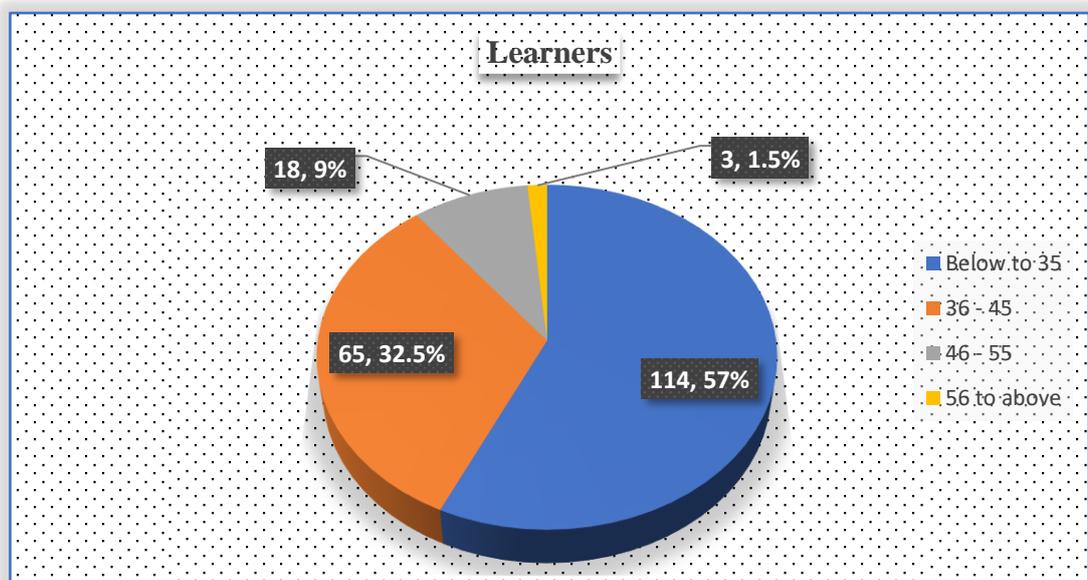


Figure 5.2.1: Age Group of Digital Library Students/Learners

The above Figure 5.2.1 illustrates that different age groups of the students / learners of digital libraries. The analysis shows that the highest number of respondents i.e., 114 (57%) are in the age group below to 35 years, followed by 65(32%) in the age bracket of 36-45 years and, 18(9%) in the age group of 46-55. Only 3 (1.5%) were above to 56-year-old. Thus, it can be concluded that majority of the respondents (89.5%) fell in age below to 45 years which was natural since the population of the study included students and young learners of digital libraries.

5.2.1.2 Gender-wise Distribution of Students / Learners

The gender wise distribution of respondents is presented in the below Figure 5.2.2. The responses have been received from male and female respondents from the students / learners of digital library programmes. It has been analysed that out of 200 respondents, 127 (63%) respondents are males while 73 (37%) are females. The above data reveals that the representation of male respondents is much more than that of the female respondents who much participated in digital library training programmes.

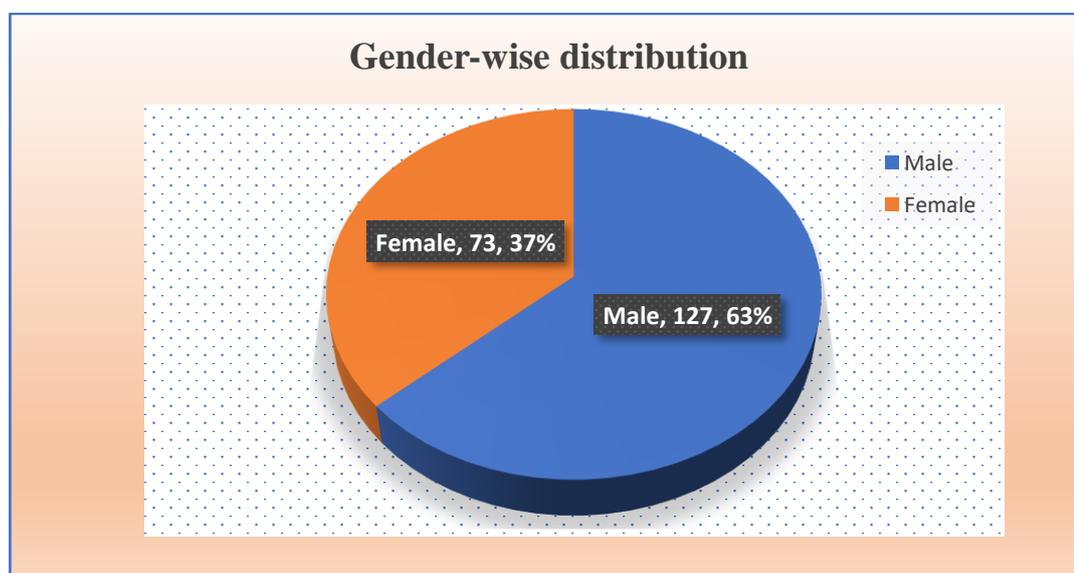


Figure 5.2.2: Gender-wise Distribution Digital Library Students/Learners

5.2.1.3 State wise Frequencies of Students / Learners

Below Figure 5.2.3 shows state wise distribution of responses received from different states of India. 200 respondents given their opinion about various aspects of digital library training and education from different 24 states out of 28 states and 8 Union territories in the country. Majority of respondents are from Uttar Pradesh (26); Karnataka (24); Rajasthan (20) and Delhi (20). Eleven (11) respondents are from

Madhya Pradesh. From Haryana, Punjab, Jammu & Kashmir - nine (9) respondents in each state filled this questionnaire. Seven (7) respondents in each state were from Gujarat, Odisha and Telangana. Same as six (6) respondents in each state were from Andhra Pradesh, Assam, Kerala and Maharashtra. From others respondents were from Tamil Nadu (8); West Bengal (4); Bihar (5) and three (3) are in each from Tripura and Uttarakhand. From Arunachal Pradesh, Chhattisgarh, Jharkhand and Manipur, only one respondent in each state was contributed of their opinions for the study.

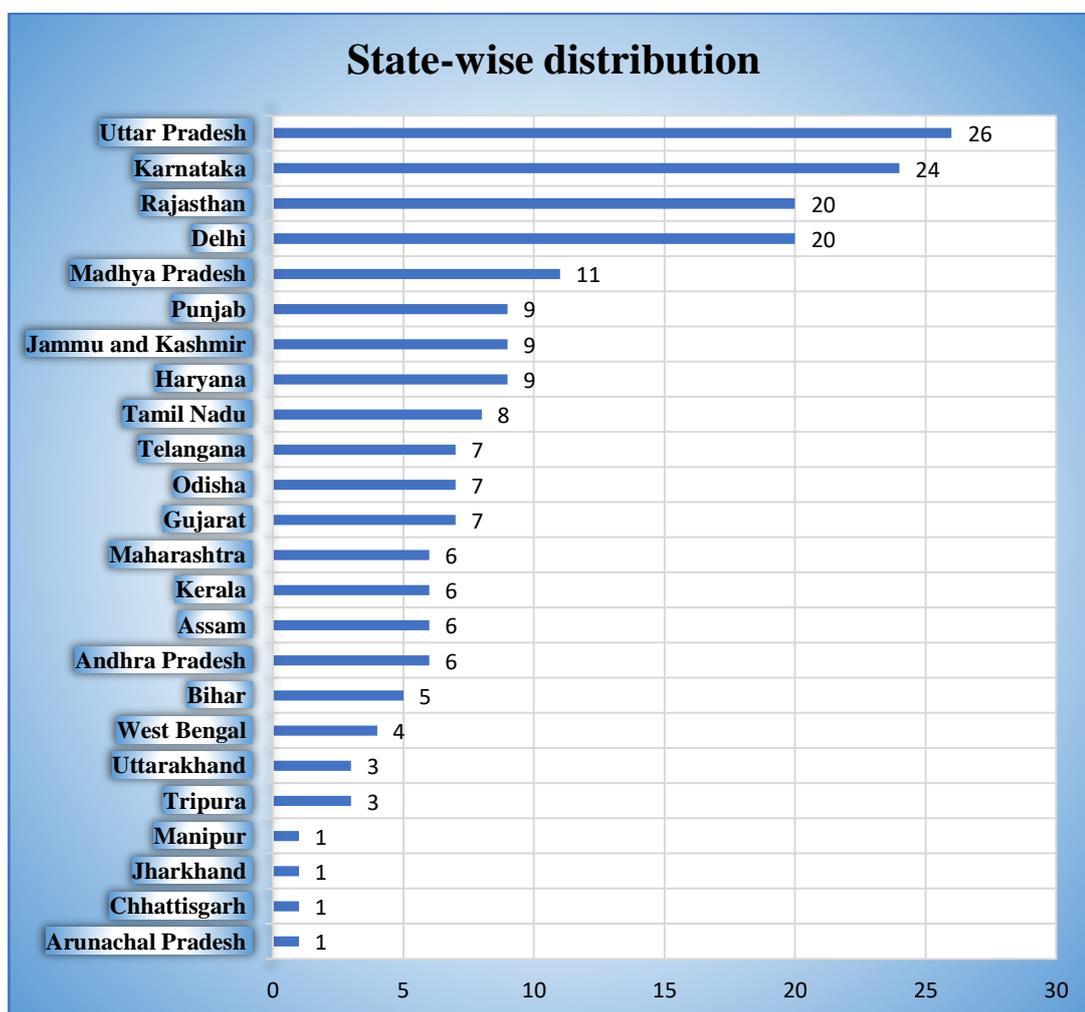


Figure 5.2.3: State-Wise Distribution of Students/Learners

5.2.1.4 Level of Education of Students / Learners

Blow Figure 5.2.4 shows levels of education of respondents from students / learners of digital library education and training in India. About 25.5% respondents having bachelor degree in library and information science. 144 (72%) out of 200 respondents having master degree in library and information science. 28 (14%) respondents having M.Phil. degree and 36 (18%) respondentias having Ph.D. degree in library and

information science along with bachelor and master degree in LIS. As well as 25 (12.5%) respondents having additional qualification in digital libraries like certificate or PG diploma courses in DLs.

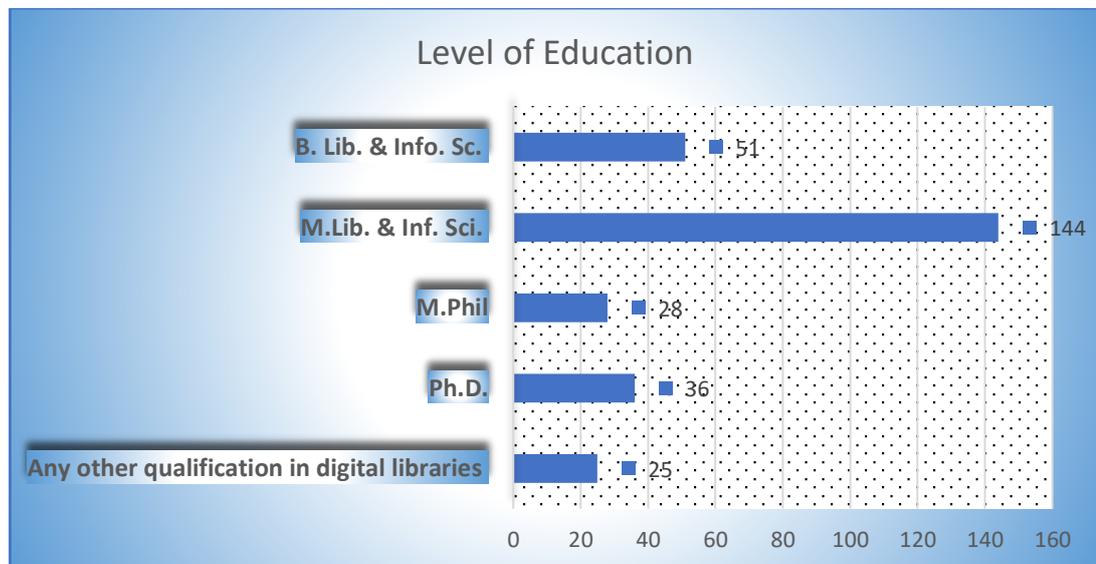


Figure 5.2.4: Level of Education of Respondents (Students/Learners)

5.2.1.5 Employment Status of Students/Learners

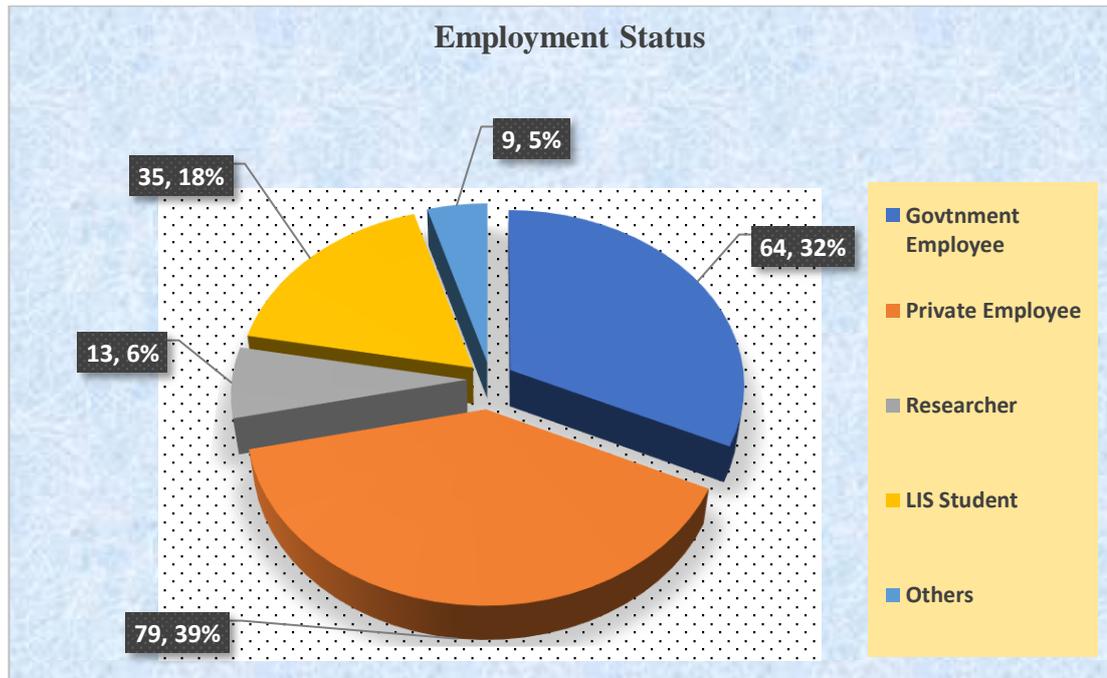


Figure 5.2.5: Employment Status of Respondents (Students/Learners)

Above Figure 5.2.5 depicts employments status of respondents (LIS professionals), who have participated in any digital library training programmes. Majority of

respondents 79 (39%) are private employees, 64(32%) are Government employee, 35(18%) are still LIS students, 13(6%) researchers and 9(5%) respondents having with other employments profile.

5.2.1.6 Professional / Research Experience in Digital Libraries of Students/Learners

The below Table 5.2.1 illustrates that in the professional/research experience of the respondents, there are four categories: Less than 5 years; 5 to 10 years; 10 to 15 years and, more than 15 years. It shows that the majority of respondents (101, i.e., 50.5%) having less than 5 years professional/ research experience. Although, 43 (21.5%) respondents having 5 to 10 years' experience; It also reveals that only 23(11.5%) respondents having 10 to 15 years and 33(16.5%) respondents having more than 15 years professionals and research experience.

Table – 5.2.1: Professional/Research Experience in Digital Libraries of Students/Learners

Years of Experience	Number of Responses	Percentage
Less than 5 years	101	50.5%
5 to 10 years	43	21.5%
10 to 15 years	23	11.5%
More than 15 years	33	16.5%
Total	200	100%

5.2.2 General Background Knowledge of Students / Learners

In this part of the questionnaire researcher examined general and background knowledge about digital libraries from the respondents such as respondents satisfaction with digital library components in the prescribed curriculum at the University level; how were they prepared to impart knowledge / creation of digital library after the graduation / post-graduation course in library and information science; Which type of training programmes they have attended as opportunities to update their knowledge of digital libraries. What are topics covered during the training programme of digital libraries. How did they get motivated and heard about the course / training on digital library that you have participated in such digital library programmes? Their experience and knowledge about the different digital library software(s). and about

funding opportunities to attend the digital library training programmes. The analysis of the data has been done in the following manner:

5.2.2.1 Satisfaction with Digital Library Components in the Prescribed Curriculum at the University Level by Students / Learners

Table 5.2.2 indicates the view of students/ learners to whether they feel that digital library components in the prescribed curriculum at the University level is satisfactory or not. 119 (i.e., 59.50%) respondents are not satisfied with the components of the digital library in the prescribed curriculum at the University level. Although, 81 (i.e., 40.50%) respondents have said ‘yes’ that they are satisfied with the components of the digital library in the prescribed curriculum at the University level. Figure 5.2.6 shows the graphical representation of the same.

Table – 5.2.2: Satisfaction with Digital Library Components in the Prescribed Curriculum at the University Level

Q. V 2.1 Are you satisfied with the components of the digital library in the prescribed curriculum at the University level?	Frequency	Percent
No	119	59.50%
Yes	81	40.50%
Missing	0	0.00%
Total	200	100.00%

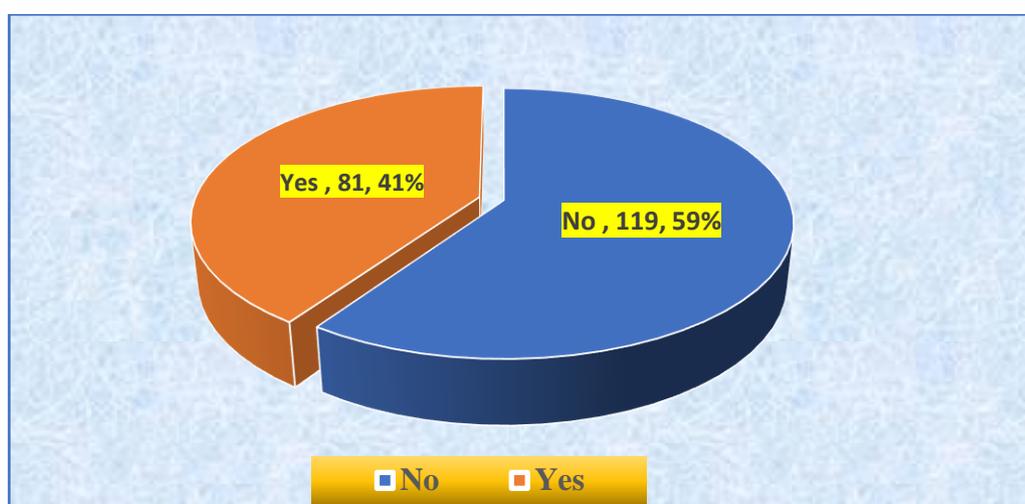


Figure 5.2.6: Graphical Representation of Satisfaction with Digital Library Components in the Prescribed Curriculum at the University Level

Satisfied respondents again asked next question that if they are satisfied with components of the digital library, please mention their level, content, limitations, etc. The followings are some comments that have been received from them (Table 5.2.3):

Table - 5.2.3: Level, Content, Limitations of Digital Library Components in the Prescribed Curriculum at the University Level

<i>Levels</i>	<i>Content</i>	<i>Limitations</i>
<ul style="list-style-type: none"> • <i>University level</i> • <i>Medium level</i> • <i>Level - digital library, digital repository, or digital collection</i> • <i>University prescribed Digital library curriculum at medium level</i> • <i>LIS curriculum most of Universities have only basic level contents and no practically exposure.</i> • <i>Institutional Repository: Accessible only on intranet or from remote accessible for authoring user.</i> • <i>At the university level they are trying to subscribe to their level best.</i> 	<ul style="list-style-type: none"> • <i>E-learning resources, Software, RFID Technology, Remotely Access, etc.</i> • <i>Content: Digital Library Services, Computer & Network Infrastructure, Digital Knowledge Organization, Access Infrastructure, Intellectual Property Right & Digital Rights Management.</i> • <i>Like eBook, e-Journal, etc.</i> • <i>RFID and all Modern Components</i> • <i>Scanning, open sources, IR,</i> • <i>DSpace</i> • <i>Greenstone</i> • <i>Metadata, Apache Lucene Data Backup.</i> • <i>More knowledgeable information retrieves from digital components like digital services</i> • <i>faculty publication, University publication, student publication, newspaper clipping. Dissertation and theses,</i> 	<ul style="list-style-type: none"> • <i>Only basic definition and features are explained. In depth knowledge into creation, development and maintenance needs to be included.</i> • <i>Easy to access for user</i> • <i>limitation is that lack of funds.</i> • <i>Copyright: Digitization violates the copy right law as the thought content of one author can be freely transfer by other without his acknowledgement.</i> • <i>Initial cost is high: – The infrastructure cost of digital library i.e., the cost of hardware, software; leasing communication circuit is generally very high.</i> • <i>Practical Hands-on Training required</i> • <i>Limitation of Copyright and Internet Connectivity</i> • <i>Online issue and return, online periodical list, newspaper clipping so on.</i> • <i>Practical aspect is missing to a great extent</i> • • <i>Practical approach should there alongside of theory.</i>

	<ul style="list-style-type: none"> • <i>Digitization and Digital Libraries - Introduction; Digitization Process; Creating Digital Libraries using DSpace (Theoretical and Practical both)</i> • <i>Installation and management of digital library software like DSpace during Curriculum.</i> • <i>Digital Library Maintained Software like Greenstone Software and also create an own IR.</i> • <i>Basics of digital library software</i> 	<ul style="list-style-type: none"> • <i>Digital library is for future in need</i> • <i>The syllabus of Digital Library paper in MLIS Curriculum only focuses on theoretical part. More emphasis should be given on practical aspect.</i> • <i>Accessible to University User, Due to copyright all the publications are not uploaded</i> • <i>But very few students are aware about Digital Library or Databases.</i> • <i>Internet connectivity not good in back bard areas college.</i> • <i>They fulfil almost all basic requirements of digital things but need to make easier and more comfortable.</i>
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The students / learners were asked to other different ways to prepared them to import knowledge / creation of digital library after taking the graduation / post-graduation course in library and information science. Respondents have described it in their own words. Some similar, repeated, or irrelevant comments have been omitted after it's shortlisting. The responses are summarized below:

- *Actually, we have knowledge of importing but in the curriculum, we have not shown how to import or export in bulk.so my suggestion some database programming must be taught in PG course of library science*
- *Adopting new technology and helping the users at my best. I just want to build a digital repository by my own*

- *After complete post-graduation i have no knowledge about digital library. Then I have taken short term course, searching tips on Google, YouTube and SWAYM portal.*
- *After completing my post-graduation, I practiced the same on my own and applied my knowledge in workplace.*
- *After completion of my master degree, i took two years' time to learn and import knowledge of automation and digital library.*
- *After getting graduation to implement knowledge in library for future generation*
- *Although we work closely with colleagues.*
- *As per our curriculum, by self-practice*
- *At least graduation and post-graduation didn't help in acquiring knowledge about digitization. I did short term advance courses in IT and gained knowledge.*
- *Attended workshops and short-term training courses in digital library*
- *Attended Workshops, seminars, etc*
- *Attending seminar and workshops*
- *Awareness of digital library*
- *By attending seminar/conference/workshop; watching video deals with digital library and by reading articles related to digital library*
- *By attending training in NISCAIR on DSpace (open-source software)*
- *By attending workshops and conferences*
- *By channelising my skills in this direction.*
- *by e library software with vender and proper training*
- *By PGDLAN and Workshops*

- *By providing access to digital resources from the mobile location of the user's*
- *By software and different kinds of apps.*
- *By some apps suggested by teachers.*
- *by using the digitization software to digitized the print materials*
- *By yourself, made own notes through online study*
- *Completed PG Diploma in Library Automation in IGNOU and attended several trainings in Digital Library (GSDL, & DSpace from NISCAIR*
- *Conference, webinars etc,*
- *Creation of DL using greenstone*
- *DSpace, Greenstone*
- *During my time at 2011, It was the Introductory basic level in my university. After the course I have undergone the extensive training programme and learnt myself after having several times practical in my own device.*
- *External training*
- *from different digital material*
- *From digital library programs*
- *From my university library, web sites, free databases and through databases which are provided by my university etc.*
- *From Senior professionals, workshop, Seminar, Training Programme, Internet and Books, Journals, Newsletters etc.*
- *From workshop, seminar*
- *I attended workshops on IR Software, where I learnt hands on practically in creating a digital library.*
- *I don't take any active role in this case.*

- *I have attended short term courses*
- *I have learned through practical work and then attended seminars and workshops for DSpace.*
- *I shell provided the digital study material. And others studying website*
- *I use this in my field for making news clipping, notes and pics*
- *I wasn't prepared because we were not provided the basic working of any digital library software*
- *Improve self-skills*
- *In Practical way.*
- *Installation of software and worked with software*
- *Journal, magazine, social media*
- *just a demo of digital library*
- *Kept myself abreast of latest development in ICT, Digital Library through Self Learning, attended conferences, workshops and seminars.*
- *Knowledge increase*
- *Learning open-source software's*
- *Library and information science*
- *Literature search and knowledge sharing by colleagues and seniors*
- *Make digital environment.*
- *Mostly I prefer self-learning method and at the same time attending workshops, searching YouTube links etc.*
- *Necessary for. Practical practice*
- *Online books issue and return*
- *Online study and some library automation course*

- *Online through Web*
- *Only basic understanding of the digital library topic knew. Learning more during working experience.*
- *Only in Library.*
- *Only theoretical*
- *Open source*
- *our future journey digitisation*
- *participated workshops and short-term training courses*
- *participated workshops and short-term training courses*
- *participated workshops and short-term training courses*
- *Post graduate digital library*
- *Primarily from my teacher, after that visiting some library like NATIONAL LIBRARY OF INDIA, some public library, some special n academic libraries, n in internship.*
- *Resources sharing*
- *Self-learning with the help of internet, community and forum related to Digital Library.*
- *Self-learning, MOOCs, YouTube Videos, Webinar, Workshop etc*
- *Self-practice through watching YouTube videos*
- *self-study*
- *Stay home digital work*
- *Teaching and Online Sources*
- *The profession is good.*
- *The syllabus covered in post-graduation course is very limited and only theory based. No exposure to practical or hands on training in*

developing digital library. After serving in the library for few years enhanced knowledge and consulting other professionals developed digital library.

- *There is so many software available for creation of digital library. Easy to use. We can convert printed material into digital formats and upload born digital and make it available digitally.*
- *There is nothing such as Import Knowledge nor Nobody just graduate and prepare to create digital Library.*
- *through knowledgeable workshops and seminars.*
- *Through on-line sources*
- *Through participation seminar, conferences, workshops etc. on digital libraries.*
- *Through Self Experiment*
- *Through Short term course and self-learning*
- *Through the process and interaction with digital technology and physical*
- *Through trainings. Through practice during course of PGDLIM*
- *Through Workshops and training programmes*
- *To attend the Training program and workshop*
- *To attend workshops, seminar etc*
- *Trained by NISCAIR in various digital library software program by NISCAIR and learn how to create digital library*
- *Updating through YouTube videos*
- *Using Open-Source Software*
- *Various sources and acquire information from the web portal in this regard*

- *Webinar, Seminar, Conferences*
- *Well honestly speaking for me practice was the key...and apart from this yes, I attended few courses in digital library from different reputational organizations like NISCAIR, INFLIBNET etc....From there I had learnt a lot.... In fact, after that most of the part of digital library was totally crystal clear...*
- *Went to NISCAIR to attend training programme, though this programme was also not sufficient.*
- *With Job and resources*
- *With Job and resources*
- *With the help of one of my Professor I have got the chance to work in Major Research Project "Creation of Institutional Repository of the University". With the help of online materials and one of my university computer professional working in University Library help a lot to learn Automation and Digital Library Software's.*
- *Working with experience library staff*
- *Yes, Make app based and very easy operated system for every human being.*
- *Yes, Library automation, Software installation, Content Management*

5.2.2.2 Updating Knowledge of Digital Libraries by Students / Learners

Table 5.2.4 depicts the view of students/ learners to whether they have undergone any additional course, workshop, seminar, or any other educational opportunities to update your knowledge of digital libraries? (Yes or No). 177 (i.e., 88.50%) respondents have undergone any additional course, workshop, seminar, or any other educational opportunities to update your knowledge of digital libraries. Although, 23 (i.e., 11.50%) respondents have not attend any additional training programmes to update your knowledge of digital libraries. Figure 5.2.7 shows graphical representation of the same.

Table – 5.2.4: Statistics of Students/Learners who Updating Knowledge of Digital Libraries

Options	Frequency	Percent
Yes	177	88.50%
No	23	11.50%
Missing	00	00.00%
Total	200	100.00%

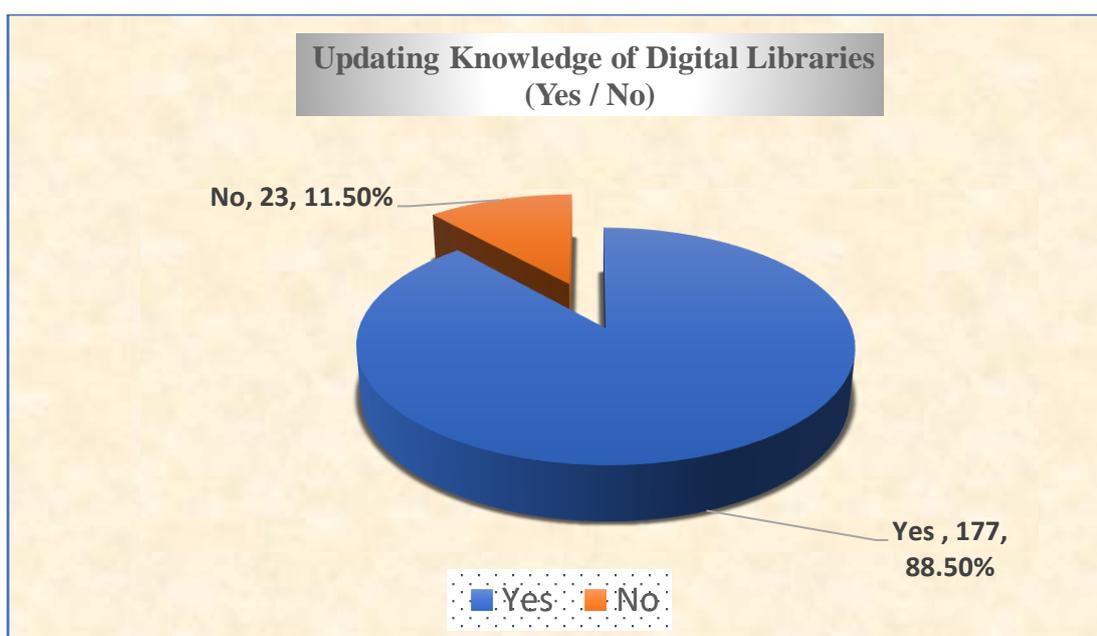


Figure 5.2.7: LIS students/Learners Updating Knowledge of Digital Libraries (Yes / No)

Positive responses that reply with ‘yes’, those students/ respondents were asked again to mentioning about covered topics of additional training course, workshop, seminar, or any other educational opportunities of digital libraries. Following are name of topics that covered in the digital library training programmes. The responses received and are summarized below in the Table 5.2.5:

Table – 5.2.5: Covered Topics in Additional Training Course, Workshop, Seminar, or Any Other Educational Opportunities of Digital Libraries

• <i>Automation, digitization</i>	• <i>Greenstone software.</i>
• <i>Basics of Digital Library software’s</i>	• <i>GSDL; DSpace and basic about digitization</i>
• <i>Building digital library</i>	• <i>GSDL Training</i>

<ul style="list-style-type: none"> • <i>Building web portal using CMS</i> 	<ul style="list-style-type: none"> • <i>How to create institutional repositories</i>
<ul style="list-style-type: none"> • <i>Certificate Programme in Digital Libraries</i> 	<ul style="list-style-type: none"> • <i>Library automation and digitization course.</i>
<ul style="list-style-type: none"> • <i>Cloud computing</i> 	<ul style="list-style-type: none"> • <i>ICT in libraries, CMS, intro to Digital library</i>
<ul style="list-style-type: none"> • <i>Software installation and features Koha, DSpace, OJS, Moodle, Joomla, Soul, Zotero, Mendeley, trinity</i> 	<ul style="list-style-type: none"> • <i>Information science</i>
<ul style="list-style-type: none"> • <i>Creation of digital library through GSDL and DSpace software</i> 	<ul style="list-style-type: none"> • <i>Information technology lecture</i>
<ul style="list-style-type: none"> • <i>Data management</i> 	<ul style="list-style-type: none"> • <i>Installation of Green-Stone and D-space</i>
<ul style="list-style-type: none"> • <i>DELNET, INFLIBNET, seminar based on digital library</i> 	<ul style="list-style-type: none"> • <i>Integrated Library Management System/Software, Reference Management Software's, Content Management Software, Bibliometric Study, etc</i>
<ul style="list-style-type: none"> • <i>Digital content creation, OER, website development, copyright etc..</i> 	<ul style="list-style-type: none"> • <i>KOHA, etc</i>
<ul style="list-style-type: none"> • <i>Digital content creation: digitization techniques</i> 	<ul style="list-style-type: none"> • <i>Library Automation and GSDL</i>
<ul style="list-style-type: none"> • <i>digital libraries in 20th century, digitization of libraries</i> 	<ul style="list-style-type: none"> • <i>Library automation, digital library workshop seminar ect</i>
<ul style="list-style-type: none"> • <i>Digital Libraries using DSpace</i> 	<ul style="list-style-type: none"> • <i>library automation, digital Library, e publications</i>
<ul style="list-style-type: none"> • <i>Digital Library (GSDL, & DSpace from NISCAIR</i> 	<ul style="list-style-type: none"> • <i>Library management</i>
<ul style="list-style-type: none"> • <i>Digital library and data management</i> 	<ul style="list-style-type: none"> • <i>Library software, library automation</i>
<ul style="list-style-type: none"> • <i>Digital Library Creation and Development</i> 	<ul style="list-style-type: none"> • <i>Libsys</i>
<ul style="list-style-type: none"> • <i>Digital library development and initiatives</i> 	<ul style="list-style-type: none"> • <i>Modern digital library</i>
<ul style="list-style-type: none"> • <i>Digital Library Education, etc</i> 	<ul style="list-style-type: none"> • <i>National Conference on Development of Digital Libraries in IPR</i>
<ul style="list-style-type: none"> • <i>Digital library organization, metadata creation, Copyrights and digital Rights. Digital library Software</i> 	<ul style="list-style-type: none"> • <i>National digital library, or for research work some websites</i>

<ul style="list-style-type: none"> • <i>Digital library software (GSDL and DSpace)</i> 	<ul style="list-style-type: none"> • <i>National workshop on using different metrics for Accessing Research Productivity</i>
<ul style="list-style-type: none"> • <i>Digital library software, creation and development</i> 	<ul style="list-style-type: none"> • <i>Newgenlib workshop and Drupal seminars</i>
<ul style="list-style-type: none"> • <i>Digital library software, installation process, and digital library technical infrastructure.</i> 	<ul style="list-style-type: none"> • <i>N-List, Koha, Soul, Shodh Ganga</i>
<ul style="list-style-type: none"> • <i>Digital library software, tools and technologies, open-source software's</i> 	<ul style="list-style-type: none"> • <i>Now situation webinar online programme classes</i>
<ul style="list-style-type: none"> • <i>Digital library software and digitization</i> 	<ul style="list-style-type: none"> • <i>Online learning</i>
<ul style="list-style-type: none"> • <i>Digital Library using DSpace, NEWGENLIB</i> 	<ul style="list-style-type: none"> • <i>Open Access Educational E-Resource</i>
<ul style="list-style-type: none"> • <i>Digital library, automation, library management, etc.,</i> 	<ul style="list-style-type: none"> • <i>Open source softwares</i>
<ul style="list-style-type: none"> • <i>Digital Library, DSpace, Greenstone</i> 	<ul style="list-style-type: none"> • <i>Orientation Programme and Refresher Course on Research</i>
<ul style="list-style-type: none"> • <i>Digital library, impact of information, library automation etc.</i> 	<ul style="list-style-type: none"> • <i>OSS in Digital Libraries (DSpace, Greenstone)</i>
<ul style="list-style-type: none"> • <i>Digital library, RFID technology</i> 	<ul style="list-style-type: none"> • <i>Pandemic period education for development of e journals etc., Digital era</i>
<ul style="list-style-type: none"> • <i>Digital resources</i> 	<ul style="list-style-type: none"> • <i>PGDLAN, Library automation and networking & Digital library etc...</i>
<ul style="list-style-type: none"> • <i>Digital transformation of libraries and education</i> 	<ul style="list-style-type: none"> • <i>Digitization, Digital Libraries and Digital Preservation, Data and Data Management Tools for Librarians, Research Information and Citation Management, E-Resource Management, Knowledge Organization in Digital Environment.</i>
<ul style="list-style-type: none"> • <i>Digitisation and automation</i> 	<ul style="list-style-type: none"> • <i>Research, CMS, automation</i>
<ul style="list-style-type: none"> • <i>Digitization processes</i> 	<ul style="list-style-type: none"> • <i>RFID, Koha and Other topics related to digital library</i>
<ul style="list-style-type: none"> • <i>DL software installation and development: basic</i> 	<ul style="list-style-type: none"> • <i>Seminar, Workshop, Webinar etc</i>
<ul style="list-style-type: none"> • <i>DL Software's and Hardware's</i> 	<ul style="list-style-type: none"> • <i>Information Technology for Information Management</i>
<ul style="list-style-type: none"> • <i>DSpace and Greenstone software</i> 	<ul style="list-style-type: none"> • <i>Social media tools for library and information services</i>

<ul style="list-style-type: none"> • <i>DSpace and KOHA Installation and primary settings</i> 	<ul style="list-style-type: none"> • <i>Theoretical Knowledge. A practical knowledge.</i>
<ul style="list-style-type: none"> • <i>DSpace training programme</i> 	<ul style="list-style-type: none"> • <i>Three days' workshop on digital libraries</i>
<ul style="list-style-type: none"> • <i>DSpace, Customization</i> 	<ul style="list-style-type: none"> • <i>Training and implemented RFID</i>
<ul style="list-style-type: none"> • <i>DSpace, Digitization, WordPress</i> 	<ul style="list-style-type: none"> • <i>Training done from Knimbus Platform</i>
<ul style="list-style-type: none"> • <i>Digital Library Architecture</i> 	<ul style="list-style-type: none"> • <i>Training on Koha, DSpace</i>
<ul style="list-style-type: none"> • <i>DSPACE, Greenstone-Print</i> 	<ul style="list-style-type: none"> • <i>Transforming Libraries and Information Centres in Digital Era.</i>
<ul style="list-style-type: none"> • <i>DSpace, Koha, Greenstone...</i> 	<ul style="list-style-type: none"> • <i>Trend in LIS profession</i>
<ul style="list-style-type: none"> • <i>DSpace: Introduction, Installation and Customization</i> 	<ul style="list-style-type: none"> • <i>Various Software's Training</i>
<ul style="list-style-type: none"> • <i>E Resources, Open software, and many more about Digitalization.</i> 	<ul style="list-style-type: none"> • <i>various training / workshop based on DSpace</i>
<ul style="list-style-type: none"> • <i>E-Journals and E-Books</i> 	<ul style="list-style-type: none"> • <i>Virtual library system.</i>
<ul style="list-style-type: none"> • <i>Emerging trends and technology in digital library.</i> 	<ul style="list-style-type: none"> • <i>Web decay and internet archive</i>
<ul style="list-style-type: none"> • <i>Greenstone digital library software</i> 	<ul style="list-style-type: none"> • <i>Webinar on d-space, e-Granthalalya, etc.</i>

23 (11.5%) respondents have not undergone any additional course, workshop, seminar, or any other educational opportunities to update their knowledge of digital libraries. They have given its reasons that due to lack of sources; time issue and they mentioned that practical not possible without Workshop and workshop practice is must every trainee.

5.2.2.3 Attended Different Types of Continuing Education Programme(s) on Digital Libraries by Students / Learners

Below Figure 5.2.8 indicates the different types of continuing education programme (s) on digital libraries, which have been attended by the LIS students/ learners to develop their skill and knowledge on digital libraries. It was found that majority of (135, i.e., 69.5%) respondents given highest preference to '**workshops**' as most effective continuing education programmes. Although Conferences; Seminars; Short-term training courses and certificate level courses have been attended by respondents respectively 114 (i.e., 57%); 109 (i.e., 54.5%); 98 (i.e., 49%) and 69 (34.5%) out of 200.

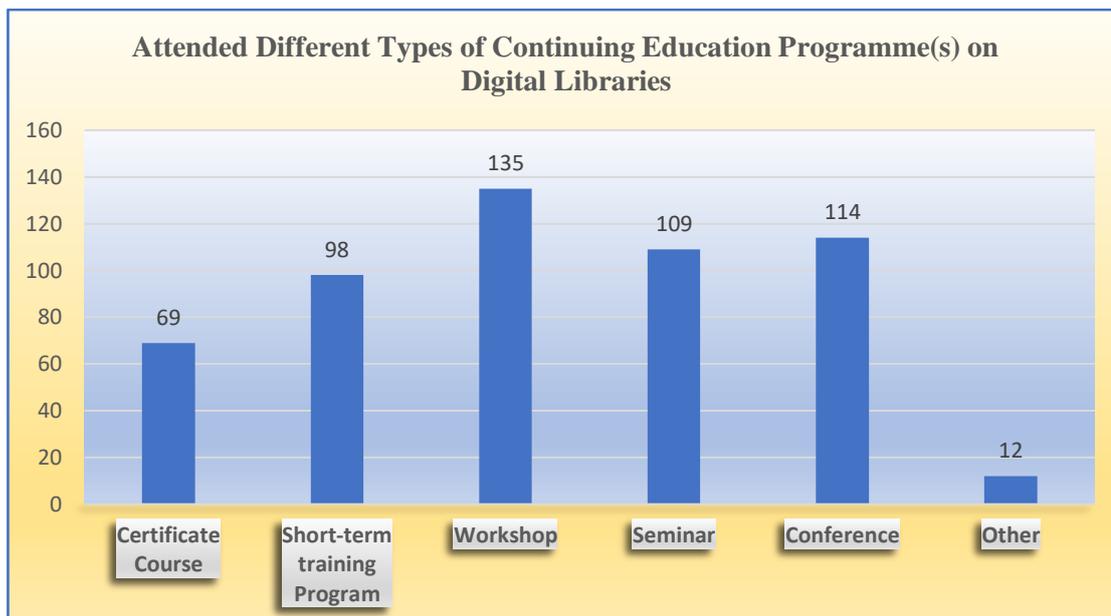


Figure 5.2.8: Attended Different Types of Continuing Education Programme(s) on Digital Libraries

5.2.2.4 Sources of Motivation and Awareness to Attend Course / Training on Digital Library

Below Figure 5.2.9 depicts the different sources of motivation and awareness for continuing education programme(s) on digital libraries, which inspired to the LIS students/ learners to attend such continuing professional educational programmes to develop their skill and knowledge on digital libraries. It was found that majority of (110, i.e., 55.00%) respondents given highest preference to ‘social media platforms (Facebook, WhatsApp, etc.)’ as most effective source of motivation and awareness to attend course / training on digital library. Although, 103(i.e., 51.50%) respondents heard/motivated through friends/ colleagues; 83 (i.e., 41.50%) through mailing-listserv / Forums; 82 (41.00%) through teachers or mentors; 79 (39.50%) through library / institute websites/blog; 35 (17.50%) through a library /institute newsletter; 26 (13.00%) through newspapers, and 8 (4.00%) respondents heard/motivated through other sources like self-motivation; magazines, etc.

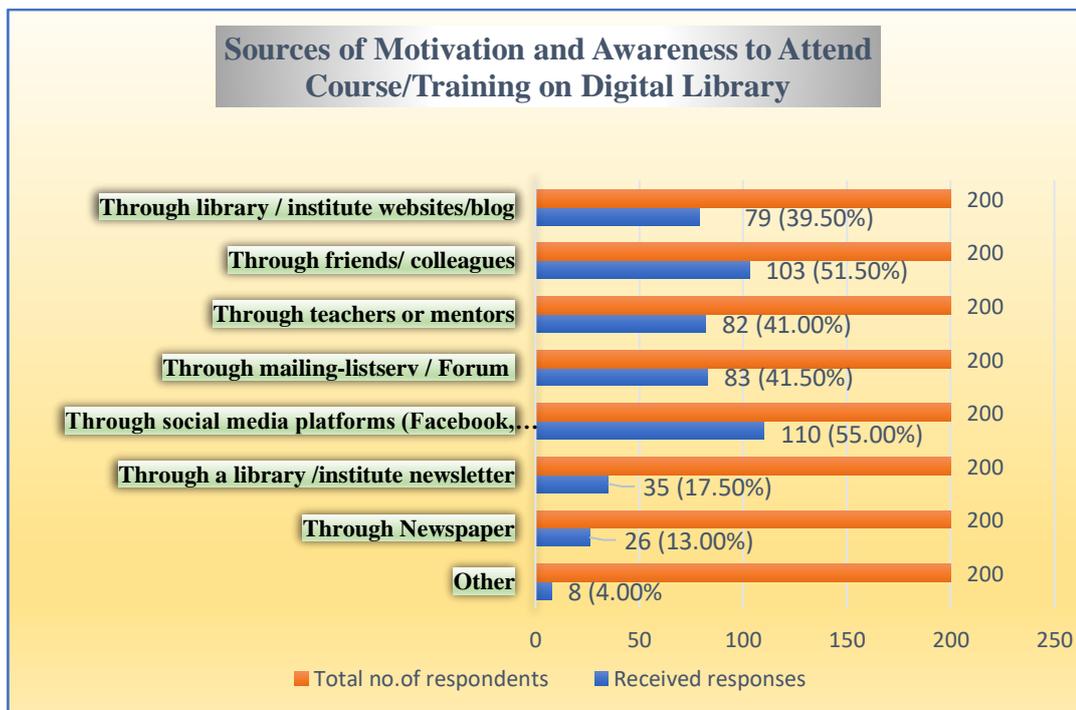


Figure 5.2.9: Sources of Motivation and Awareness to Attend Course/Training on Digital Library

5.2.2.5 Experience and Knowledge of Digital Library Softwares of Students / Learners

Table 5.2.6 indicates experience and knowledge about different digital library softwares (DSpace; Greenstone Digital Library Software (GSDL); E-Prints and Fedora) of LIS students/ learners. It was found that respondents have good knowledge and experience on DSpace and Greenstone Digital Library Software and they have poor experience and knowledge on E-Prints and Fedora software. Respondents were asked to give names of any other digital library softwares, if they have experience and knowledge on it. Some respondents have experience and knowledge of other digital library software, like *Samvera software*; *Knimbus software*; *Omeka software*. These softwares also suggested for creating and developing digital *libraries or institutional repositories*. Figure 5.2.10 shows the graphical representation of the same.

Table – 5.2.6: Experience and Knowledge of Digital Library Softwares

Software	Poor (%)	Fair (%)	Average (%)	Good (%)	Excellent (%)	Total
DSpace	13 (6.50%)	33 (16.50%)	55 (27.50%)	61 (30.50%)	38 (19.00%)	200

GSDL	24 (12.00%)	46 (23.00%)	59 (29.50%)	51 (25.50%)	20 (10.00%)	200
E-Prints	64 (32.00%)	30 (15.00%)	49 (24.50%)	46 (23.00%)	11 (5.50%)	200
Fedora	76 (38.00%)	33 (16.50%)	44 (22.00%)	36 (18.00%)	11 (5.50%)	200

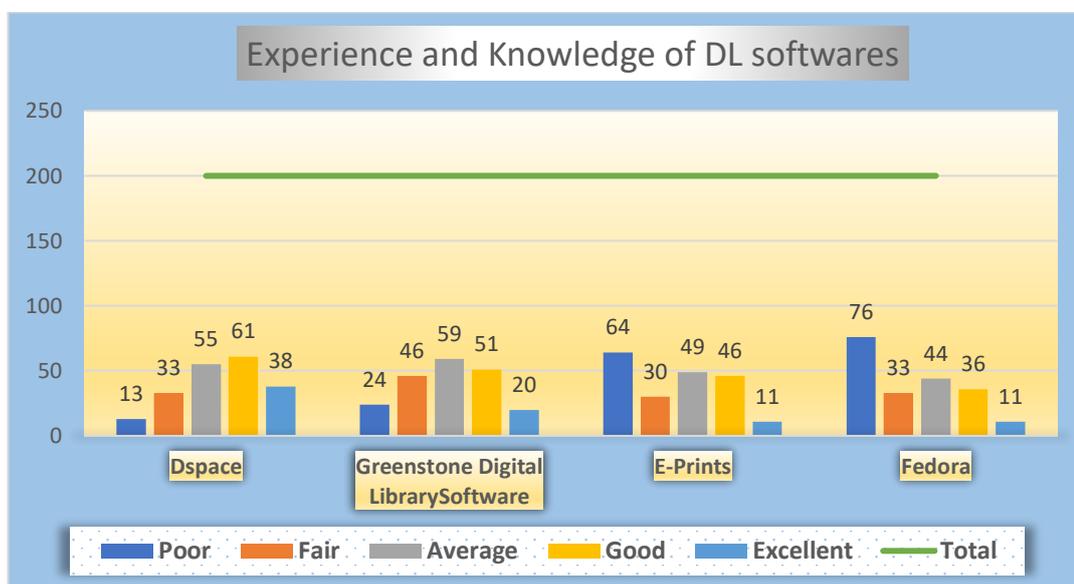


Figure 5.2.10: Experience and Knowledge of Digital Library Softwares

5.2.2.6 Sponsoring / Funding Opportunities to Attending Continuing Education and Training Programmes on Digital Libraries

The financial matters are very important for getting quality educating and training. Figure 5.2.11 indicates, how respondents have got funding or financial assistance to attend continuing professional education (CPE) on digital libraries. It shows that majority of 124 (i.e., 62%) respondents have not got any financial assistance for attending such professional development programmes like seminar; workshops; conferences; short-term training courses, etc. Whereas, 42(i.e., 21%) respondents were sponsored by their working institutes; 28 (i.e., 14%) respondents were sponsored by organising institutes, and 6 (i.e., 3%) respondents were sponsored by other assistance bodies and other sources. It is found that there were very less sponsoring and funding opportunities available for participating in such education and training programmes on digital libraries in India.

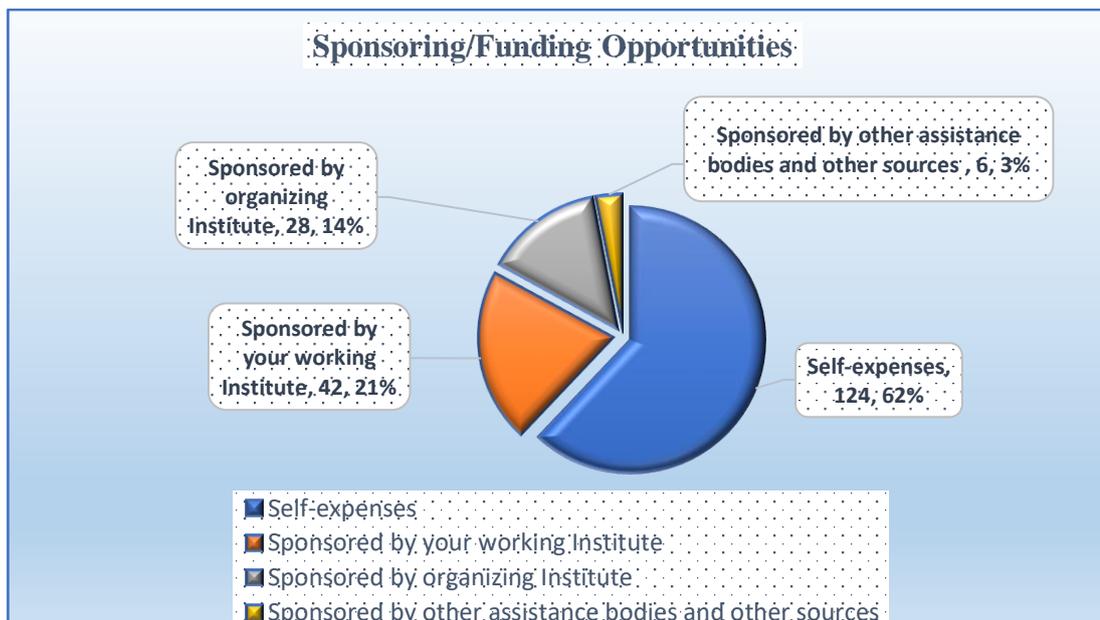


Figure 5.2.11: Different Sponsoring / Funding Opportunities for Attending CPE on Digital Libraries

5.2.3 Attitude of Students / Learners regarding Digital Library Education and Training in India

There are many issues that affect digital library education and training in India. In the context of the learners of digital library education and training, we can try to know it through their opinion. In this section respondents were asked that how do they perceive on attending training/course on digital libraries? The main focus of the questionnaire survey was to understand the perceptions about the different issues, challenges and related aspects of digital library education and training in India from students / learner's point of view. The questionnaire lists 36 statements in 9 sections as presented in below tables and figures, which were framed to understand the attitude of students/ learners regarding digital library education and training in India. A five-point Likert scale has been used for measuring agreement and disagreement.

5.2.3.1 General / Basic Knowledge of Students / Learners

An analysis of the data in Table 5.2.7 shows that students/learners attitude towards general/basic knowledge of digital library technicalities. For the purpose of analysis responses in Table 5.2.7 are clubbed into three groups of combined agreement [Strongly Agree (SA) plus Agree (AG)], combined disagreement [Disagree (DS) plus Strongly Disagree (SD)] and Neutral (NE) in percentages for each statement to

highlight dilemmas among groups of professionals. The statements 3.1.1, 3.1.2, 3.1.3 and 3.1.4 are meant to assess the attitude of the respondent towards the general or basic knowledge about computer and information technology. E.g., the statement 3.1.1 focuses on basic knowledge of computer, operating systems; statement 3.1.2 focuses on browsing and searching skills on internet; statement 3.1.3 focuses on computer networking, and 3.1.4 focuses on open source softwares of digital library.

The statement at 3.1.1 has 59.50% respondents in favour of agreement. It proves that the majority of the students / learners still feeling lack of basic knowledge on computer and operating systems like Windows and Linux. However, a minority of 30.00% disagrees with the statement and believes in Still lack of basic knowledge of computer, operating systems (Windows/Linux).

The statement at 3.1.2 i.e., *Still lack of practice of browsing and searching on internet* has 49.00% respondents in agreement and 34.50% in disagreement while 16.50% were neutral.

Whereas, in the statement at 3.1.3 i.e., *“Still lack of knowledge about computer networking”* has 58.00% respondents in agreement and 27.00% in disagreement while 15.00% were neutral.

However, their responses to the next statement 3.1.4 i.e., *“Still lack of basic knowledge about open source softwares of digital library”* is noteworthy as are 59.50% in agreement with this statement and 28.00% in disagreement while 12.50% were neutral. It shows that majority of students / learners are less aware and known about open source softwares. Figure 5.2.12 shows the graphical representation of the same.

Table – 5.2.7: Students/Learners Attitude Towards General/Basic Knowledge

(Total Resp. = 200)

S. No.	Statement	SA	AG	NE	DS	SD
3.1.1	Still lack of basic knowledge of computer, operating systems (Windows/Linux)	42	77	21	33	27
		21.00%	38.50 %	10.50 %	16.50 %	13.50 %
		CA = 59.50%			CD = 30.00%	

3.1.2	Still lack of practice of browsing and searching on internet	30	68	33	37	32
		15.00%	34.00%	16.50%	18.50%	16.00%
		CA = 49.00%			CD = 34.50%	
3.1.3	Still lack of knowledge about computer networking	33	83	30	29	25
		16.50%	41.50%	15.00%	14.50%	12.50%
		CA = 58.00%			CD = 27.00%	
3.1.4	Still lack of basic knowledge about open source softwares of digital library	36	83	25	29	27
		18.00%	41.50%	12.50%	14.50%	13.50%
		CA = 59.50%			CD = 28.00%	

SA = Strongly Agree; AG = Agree; NE = Neutral; DA = Disagree; SD = Strongly Disagree; CA. = Combined Agreement; CD = Combined Disagreement.

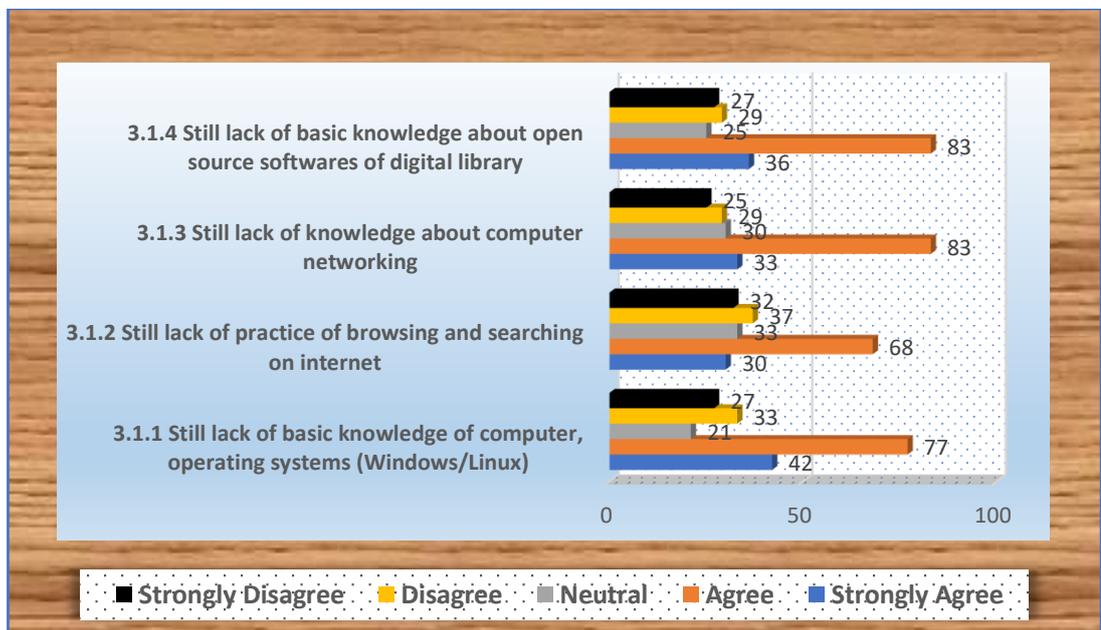


Figure 5.2.12: Graphical Representation of Digital Library Students/Learners Attitude Towards General/Basic Knowledge

5.2.3.2 Students/Learners Attitude Towards Infrastructure and Resources

LIS students/ learners were asked to mention their views and thoughts with regard availability of infrastructure and resources for digital library training and education. They were asked four questions related to infrastructure and resources on which they

were to agree or disagree. The details of the responses have been shown in Table 5.2.8. The first statement was 3.3.1, i.e., “*Lack of building infrastructure with necessary facilities and furniture*” on reply to this, 24.50% agreed strongly while 46.50% just agreed with the statement. From combining the responses of “Agree” (AG) and “Strongly Agree (SA), it can be analysed that 71.00% respondents feel lack of building infrastructure with necessary facilities and furniture for digital library education and training and 12.50% disagreed upon this statement while 16.50% were neutral.

Second statement at 3.2.2, i.e., “*Lack of audio-visual aids (like Projector, Speaker, Mike, Smart board, teaching aids etc.)*” To this majority of the respondents i.e., 69.50% agreed upon it and 14.50% in disagreement while 16.00% were neutral.

Whereas, in the statement at 3.2.3 i.e., “*Computer labs are not well equipped (availability of adequate number of computers and viable internet connection)*” has 61.50% respondents in agreement and 19.00% in disagreement while 19.50% were neutral.

The statement at 3.2.4, i.e., “*Sometimes technical problems occur (such as: internet bandwidth, power outage, software installation, etc)*” To this majority of respondents, i.e., 72.00% agreed upon it, 11.50% were disagreed and 16.50% were neutral.

Therefore, from the table 5.2.8 it is clear that a good majority of the digital library students / learners agree upon the questions regarding different issues of infrastructure and resources for digital library education and training in India. Figure 5.2.13 shows the graphical representation of the same.

Table – 5.2.8: Digital Library Students/Learners Attitude Towards Infrastructure and Resources

(Total Resp. = 200)

S. No.	Statement	SA	AG	NE	DS	SD
3.2.1	Lack of building infrastructure with necessary facilities and furniture	49	93	33	20	5
		24.50%	46.50%	16.50%	10.00%	2.50%
		CA = 71.00%			CD = 12.50%	
3.2.2	Lack of audio-visual aids (like Projector,	41	98	32	25	4
		20.50%	49.00%	16.00%	12.50%	2.00%

	Speaker, Mike, Smart board, teaching aids etc.)	CA = 69.50%			CD = 14.50%	
3.2.3	Computer labs are not well equipped (availability of adequate number of computers and viable internet connection)	43	80	39	29	9
		21.50%	40.00%	19.50%	14.50%	4.50%
		CA = 61.50%			CD = 19.00%	
3.2.4	Sometimes technical problems occur (such as: internet bandwidth, power outage, software installation, etc)	50	94	33	15	8
		25.00%	47.00%	16.50%	7.50%	4.00%
		CA = 72.00%			CD = 11.50%	

SA = Strongly Agree; AG = Agree; NE = Neutral; DA = Disagree; SD = Strongly Disagree; CA. = Combined Agreement; CD = Combined Disagreement.

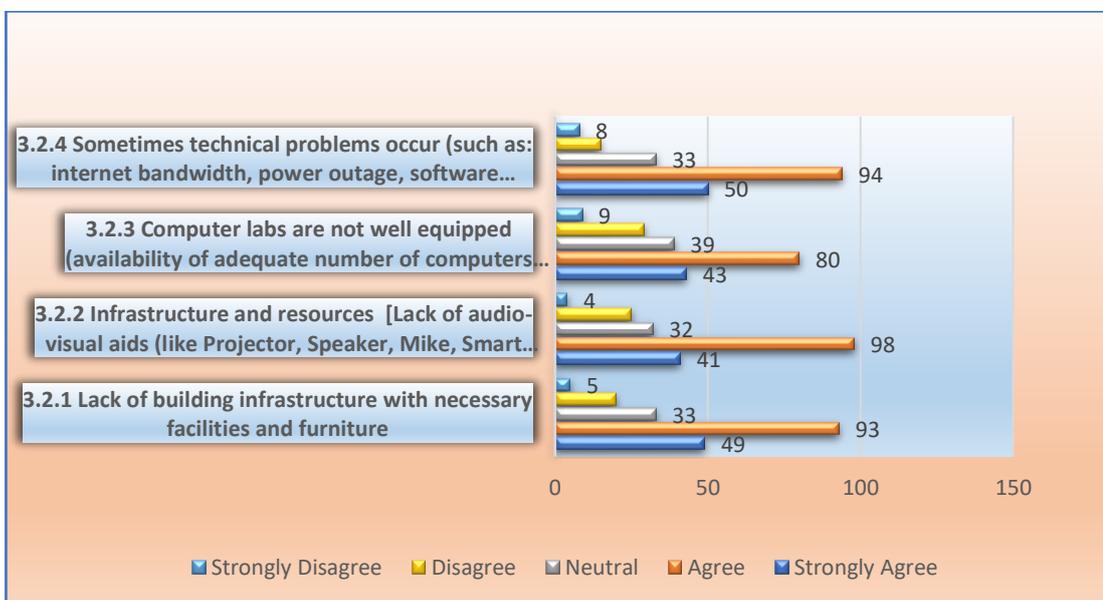


Figure 5.2.13: Graphical Representation of Digital Library Students/Learners Attitude Towards Infrastructure and Resources

5.2.3.3 Students/Learners Attitude Towards Institutional / Organizational Support

The below table 5.2.9 helps in comprehending the institutional / organizational support to the LIS students / learners to attend digital library education and training programmes. They were asked three questions related to institutional / organizational support on which they were to agree or disagree. For the purpose of analysis responses

in Table 5.2.9 are clubbed into three groups of combined agreement [Strongly Agree (SA) plus Agree (AG)], combined disagreement [Disagree (DS) plus Strongly Disagree (SD)] and Neutral (NE) in percentages for each statement to highlight dilemmas among respondents.

The statement at 3.3.1, i.e., *“Lack of institutional / organizational support in encouraging and allowing you to participate in digital library training /course”* has 69.50% respondents in agreement and 17.50% in disagreement while 13.00% were neutral.

The statement at 3.3.2, i.e., *“There is a communication gap between training organizer and participant”* has 59.00% respondents in agreement and 20.00% in disagreement while 21.00% were neutral.

The statement at 3.3.3, i.e., *“Lack of Funding opportunities (Inadequate financial support from the sponsoring bodies)”* has 73.00% respondents in agreement and 10.50% in disagreement while 16.50% were neutral.

Therefore, from the table 5.2.9 it is clear that a good majority of the digital library students/learners agree upon the questions regarding different issues of institutional/organizational support for digital library education and training in India. So, it can be inferred that the digital library students/learners feel a lack of institutional or organizational support in a various manner regards to attending digital library education and training programmes. Figure 5.2.14 shows the graphical representation of the same.

Table – 5.2.9: Digital Library Students/Learners Attitude Towards Institutional/Organizational Support

(Total Resp. = 200)

S. No.	Statement	SA	AG	NE	DS	SD
3.3.1	Lack of institutional / organizational support in encouraging and allowing you to participate in digital library training /course	52	87	26	28	7
		26.00%	43.50%	13.00%	14.00%	3.50%
		CA = 69.50%			CD = 17.50%	

3.3.2	There is a communication gap between training organizer and participant	29	89	42	33	7
		14.50%	44.50%	21.00%	16.50%	3.50%
		CA = 59.00%			CD = 20.00%	
3.3.3	Lack of Funding opportunities (Inadequate financial support from the sponsoring bodies)	70	76	33	19	2
		35.00%	38.00%	16.50%	9.50%	1.00%
		CA = 73.00%			CD = 10.50%	

SA = Strongly Agree; AG = Agree; NE = Neutral; DA = Disagree; SD = Strongly Disagree; CA. = Combined Agreement; CD = Combined Disagreement.

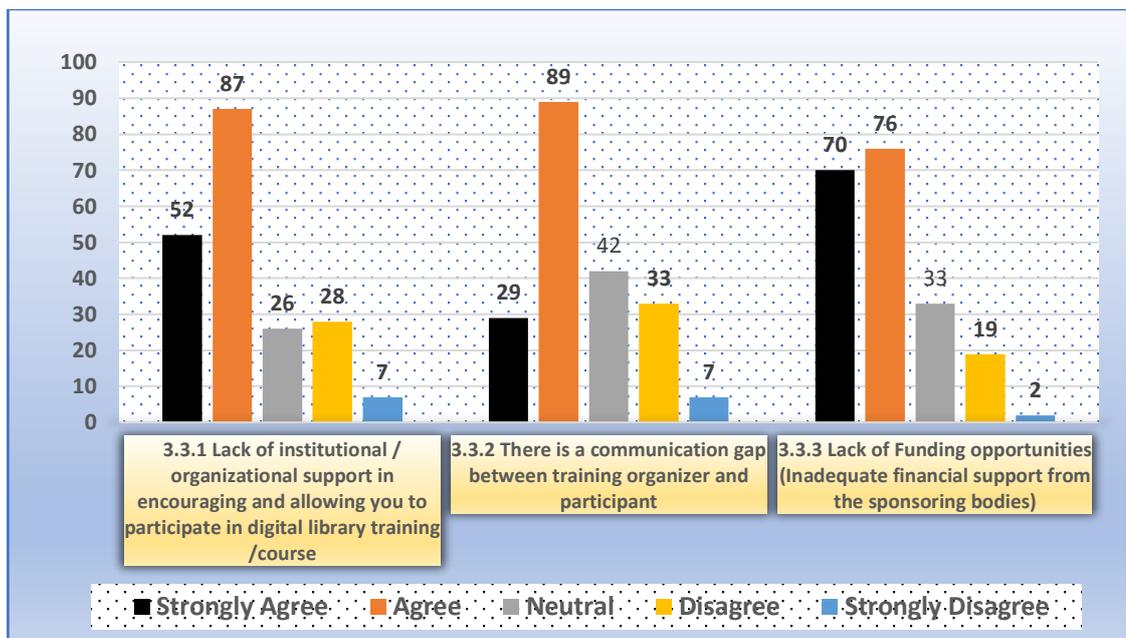


Figure 5.2.14: Graphical Representation of Digital Library Students/Learners Attitude Towards Institutional/Organizational Support

5.2.3.4 Students/Learners Attitude Towards Study and Learning Material on Digital Libraries

An analysis of the data in Table 5.2.10 shows that digital library students/learners attitude towards study and learning material on digital libraries. They were asked four questions related to study and learning material on digital libraries on which they were to agree or disagree. For the purpose of analysis responses in Table 5.2.10 are clubbed into three groups of combined agreement [Strongly Agree (SA) plus Agree (AG)],

combined disagreement [Disagree (DS) plus Strongly Disagree (SD)] and Neutral (NE) in percentages for each statement to highlight dilemmas among groups of professionals.

The statement at 3.4.1, i.e., “Lack of availability of adequate updated and rich course content on digital libraries” has 66.00% respondents in agreement and 19.00% in disagreement while 15.00% were neutral.

The statement at 3.4.2, i.e., “Course content on the digital library having less quality in terms of accuracy, understanding, and reading” has 57.00% respondents in agreement and 22.00% in disagreement while 13.00% were neutral.

The statement at 3.4.3, i.e., “Lack of enough content in indigenous languages on digital libraries” has 70.00% respondents in agreement and 15.00% in disagreement while 15.00% were neutral.

The statement at 3.4.4, i.e., “Problem faced in accessing course content via online or offline mode” has 59.50% respondents in agreement and 17.00% in disagreement while 23.50% were neutral.

Hence, from table 5.2.10 it is clear that a good majority of the digital library students/learners agree upon the questions regarding different issues of study and learning material for digital library education and training in India. Figure 5.2.15 shows the graphical representation of the same.

Table – 5.2.10: Digital Library Students/Learners Attitude Towards Study and Learning Material

(Total Resp. = 200)

S. No.	Statement	SA	AG	NE	DS	SD
3.4.1	Lack of availability of adequate updated and rich course content on digital libraries	39	93	30	26	12
		19.50%	46.50%	15.00%	13.00%	6.00%
		CA = 66.00%			CD = 19.00%	
3.4.1	Course content on the digital library having less quality	31	83	42	35	9
		15.50%	41.50%	21.00%	17.50%	4.50%

	in terms of accuracy, understanding, and reading	CA = 57.00%			CD = 22.00%	
3.4.1	Lack of enough content in indigenous languages on digital libraries	45	95	30	24	6
		22.50%	47.50%	15.00%	12.00%	3.00%
		CA = 70.00%			CD = 15.00%	
3.4.1	Problem faced in accessing course content via online or offline mode	26	93	47	30	4
		13.00%	46.50%	23.50%	15.00%	2.00%
		CA = 59.50%			CD = 17.00%	

SA = Strongly Agree; AG = Agree; NE = Neutral; DA = Disagree; SD = Strongly Disagree; CA. = Combined Agreement; CD = Combined Disagreement.

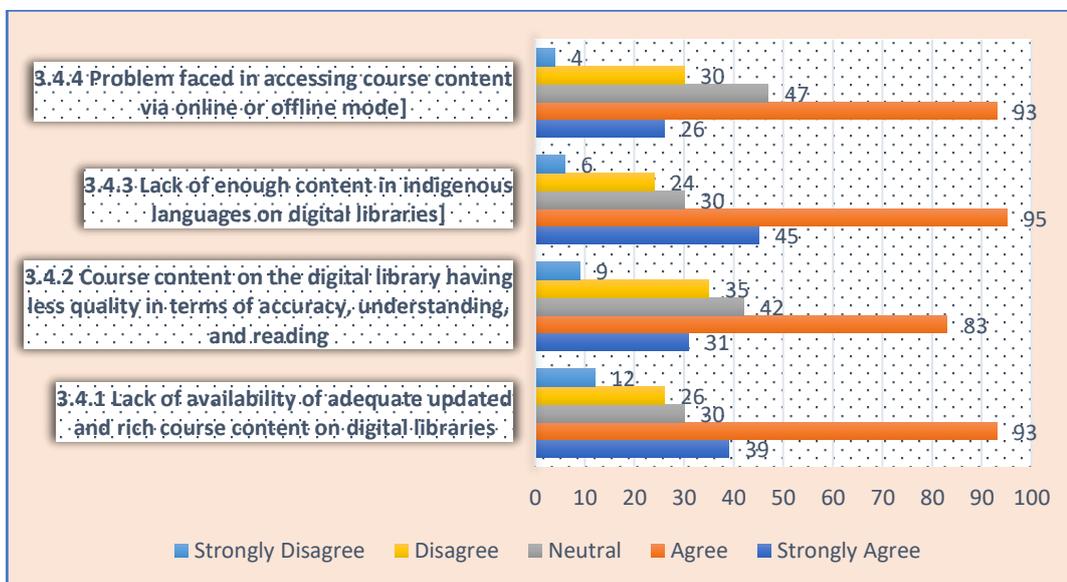


Figure 5.2.15: Graphical Representation of Digital Library Students/Learners Attitude Towards Study and Learning Material

5.2.3.5 Students/Learners Attitude Towards Their Personal Issues

The below table 5.2.11 helps in comprehending the personal issues of digital students/learners to attending digital library education and training programmes. They were asked four questions related to their personal issues on which they were to agree or disagree. For the purpose of analysis responses in Table 5.2.11 are clubbed into three groups of combined agreement [Strongly Agree (SA) plus Agree (AG)],

combined disagreement [Disagree (DS) plus Strongly Disagree (SD)] and Neutral (NE) in percentages for each statement to highlight dilemmas among respondents.

The statement at 3.5.1, i.e., “Lack of awareness about digital library education and training opportunities” has 78.00% respondents in agreement and 14.00% in disagreement while 8.00% were neutral.

The statement at 3.5.2, i.e., “Language is a barrier for understanding digital libraries to students / learners” has 63.50% respondents in agreement and 20.00% in disagreement while 16.50% were neutral.

The statement at 3.5.3, i.e., “Fee of training/course was not affordable” has 70.00% respondents in agreement and 15.00% in disagreement while 15.00% were neutral.

The statement at 3.5.4, i.e., “Lack of time for planning for education and training on digital libraries” has 71.50% respondents in agreement and 12.00% in disagreement while 16.50% were neutral.

Therefore, from the table 5.2.11 it can be understood that a majority of the digital library students/learners having their different personal issues that barrier in attending digital library education and training programmes. Figure 5.2.16 shows the graphical representation of the same.

Table – 5.2.11: Students/Learners Attitude Towards their Personal Issues

(Total Resp. = 200)

S. No.	Statement	SA	AG	NE	DS	SD
3.5.1	Lack of awareness about digital library education and training opportunities	43	113	16	24	4
		21.50%	56.50%	8.00%	12.00%	2.00%
		CA = 78.00%			CD = 14.00%	
3.5.2	Language is a barrier for understanding digital libraries to students / learners	35	92	33	34	6
		17.50%	46.00%	16.50%	17.00%	3.00%
		CA = 63.50%			CD = 20.00%	

3.5.3	Fee of training/course was not affordable	39	101	30	25	5
		19.50%	50.50%	15.00%	12.50%	2.50%
		CA = 70.00%			CD = 15.00%	
3.5.4	Lack of time for planning for education and training on digital libraries	32	111	33	21	3
		16.00%	55.50%	16.50%	10.50%	1.50%
		CA = 71.50%			CD = 12.00%	

SA = Strongly Agree; AG = Agree; NE = Neutral; DA = Disagree; SD = Strongly Disagree; CA. = Combined Agreement; CD = Combined Disagreement.

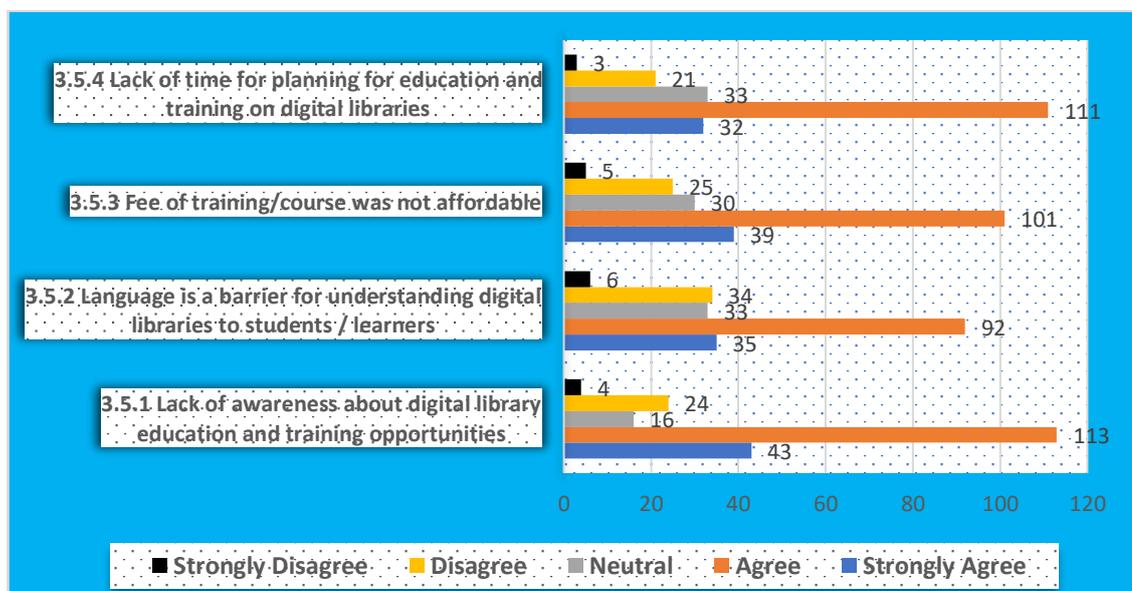


Figure 5.2.16: Graphical Representation of Students/Learners Attitude Towards their Personal Issues

5.2.3.6 Students/ Learners Attitude Towards Teacher/ Experts Attitude

An analysis of the data in Table 5.2.12 shows that digital library students/learners attitude towards teacher/ trainer's attitude. They were asked four questions related to digital library teacher/ trainer's attitude on which they were to agree or disagree. For the purpose of analysis responses in Table 5.2.12 are clubbed into three groups of combined agreement [Strongly Agree (SA) plus Agree (AG)], combined disagreement [Disagree (DS) plus Strongly Disagree (SD)] and Neutral (NE) in percentages for each statement to highlight dilemmas among groups of professionals.

The statement at 3.6.1, i.e., “*The teacher/ trainer/ (s) was/were well knowledgeable, well prepared and expert in area of digital library*” has 80.00% respondents in agreement and 6.00% in disagreement while 14.00% were neutral.

The statement at 3.6.2, i.e., “*Training / lecture method was effective and interaction with trainer / teacher (s) was/were very fruitful*” has 80.00% respondents in agreement and 5.50% in disagreement while 14.50% were neutral.

The statement at 3.6.3, i.e., “*During the training / course trainer/ teacher (s) was/were punctual and regular taken their classes*” has 80.50% respondents in agreement and 7.50% in disagreement while 12.00% were neutral.

The statement at 3.6.4, i.e., “*All topics / queries were not covered within that time duration of training / course*” has **66.50%** respondents in agreement and **12.50%** in disagreement while 21.00% were neutral.

Hence, from table 5.2.12 it is clear that a good majority of the digital library students/learners were satisfied teacher/ trainers attitude during the digital library education and training courses/programmes. But after the ending they feel that their all queries related to digital libraries have not solved. Figure 5.2.17 shows the graphical representation of the same.

Table – 5.2.12: Students/ Learners Attitude Towards Teacher/Experts Attitude

(Total Resp. = 200)

S. No.	Statement	SA	AG	NE	DS	SD
3.6.1	The teacher/ trainer/ (s) was/were well knowledgeable, well prepared and expert in area of digital library	57	103	28	6	6
		28.50%	51.50%	14.00%	3.00%	3.00%
		CA = 80.00%			CD = 6.00%	
3.6.2	Training / lecture method was effective and interaction with trainer / teacher (s)	43	117	29	7	4
		21.50%	58.50%	14.50%	3.50%	2.00%
		CA = 80.00%			CD = 5.50%	

	was/were very fruitful					
3.6.3	During the training / course trainer / teacher (s) was/were punctual and regular taken their classes	39	122	24	11	4
		19.50%	61.00%	12.00%	5.50%	2.00%
		CA = 80.50%			CD = 7.50%	
3.6.4	All topics / queries were not covered within that time duration of training / course	40	93	42	17	8
		20.00%	46.50%	21.00%	8.50%	4.00%
		CA = 66.50%			CD = 12.50%	

SA = Strongly Agree; AG = Agree; NE = Neutral; DA = Disagree; SD = Strongly Disagree; CA. = Combined Agreement; CD = Combined Disagreement.

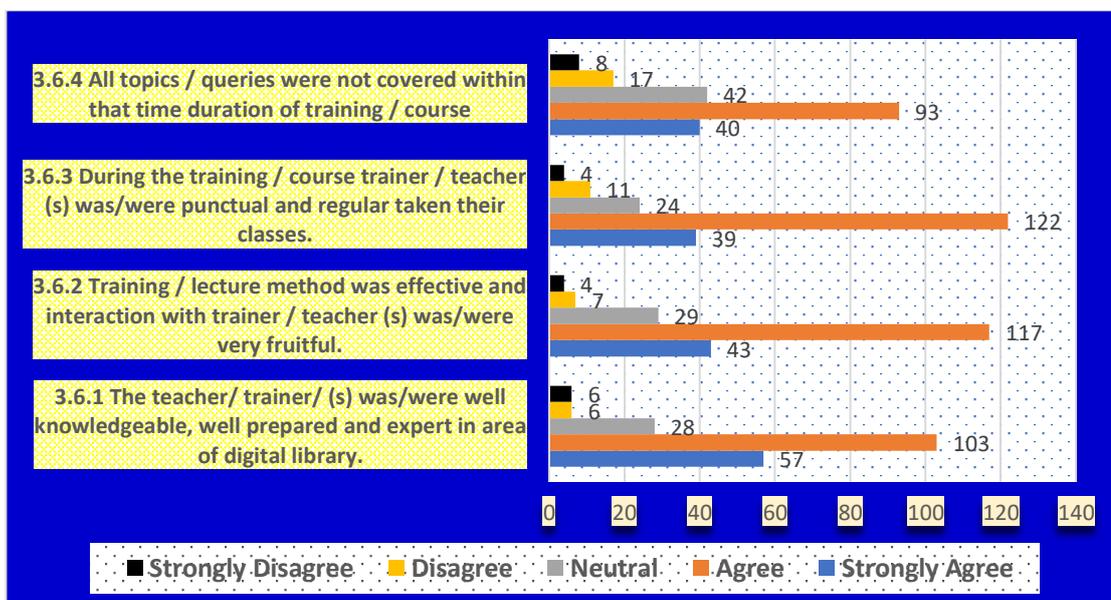


Figure 5.2.17: Graphical Representation of Students/Learners Attitude Towards Teacher/Experts Attitude

5.2.3.7 Students/ Learners Attitude Towards Implementation of Digital Libraries

The below Table 5.2.13 helps in comprehending the various issues related to implementation of digital libraries after the completing digital library education and training programmes. They were asked four questions related to related to implementation of digital libraries on which they were to agree or disagree. For the purpose of analysis responses in Table 5.2.13 are clubbed into three groups of

combined agreement [Strongly Agree (SA) plus Agree (AG)], combined disagreement [Disagree (DS) plus Strongly Disagree (SD)] and Neutral (NE) in percentages for each statement to highlight dilemmas among respondents.

The statement at 3.7.1, i.e., “Lack of advance knowledge about tools & technologies used for the development of digital library” has 75.50% respondents in agreement and 12.50% in disagreement while 12.00% were neutral.

The statement at 3.7.2, i.e., “Lack of solutions/support facility from faculties/ experts regarding queries of digital library design, creation and implementation” has 74.50% respondents in agreement and 11.50% in disagreement while 14.00% were neutral.

The statement at 3.7.3, i.e., “Lack of own-resources for practicing /implementation” has 79.50% respondents in agreement and 10.00% in disagreement while 10.50% were neutral.

The statement at 3.5.4, i.e., “Lack of knowledge about creative-commons licenses, copyright and legal issues” has 72.00% respondents in agreement and 12.00% in disagreement while 16.00% were neutral.

Therefore, from the Table 5.2.13 it can be understood that a majority of the digital library students/learners having their different issues related to implementation of digital libraries that are challenges and affecting digital library education and training programmes. Figure 5.2.18 shows the graphical representation of the same.

Table – 5.2.13: Students/ Learners Attitude Towards Implementation of Digital Libraries

(Total Resp. = 200)

S. No.	Statement	SA	AG	NE	DS	SD
3.7.1	Lack of advance knowledge about tools & technologies used for the development of digital library	49	102	24	22	3
		24.50%	51.00%	12.00%	11.00%	1.50%
		CA = 75.50%			CD = 12.50%	
3.7.2	Lack of solutions/support facility from faculties/	38	111	28	18	5
		19.00%	55.50%	14.00%	9.00%	2.50%

	experts regarding queries of digital library design, creation and implementation	CA = 74.50%			CD = 11.50%	
3.7.3	Lack of own-resources for practicing /implementation	42	117	21	17	3
		21.00%	58.50%	10.50%	8.50%	1.50%
		CA = 79.50%			CD = 10.00%	
3.7.4	Lack of knowledge about creative-commons licenses, copyright and legal issues	43	101	32	20	4
		21.50%	50.50%	16.00%	10.00%	2.00%
		CA = 72.00%			CD = 12.00%	

SA = Strongly Agree; AG = Agree; NE = Neutral; DA = Disagree; SD = Strongly Disagree; CA. = Combined Agreement; CD = Combined Disagreement.

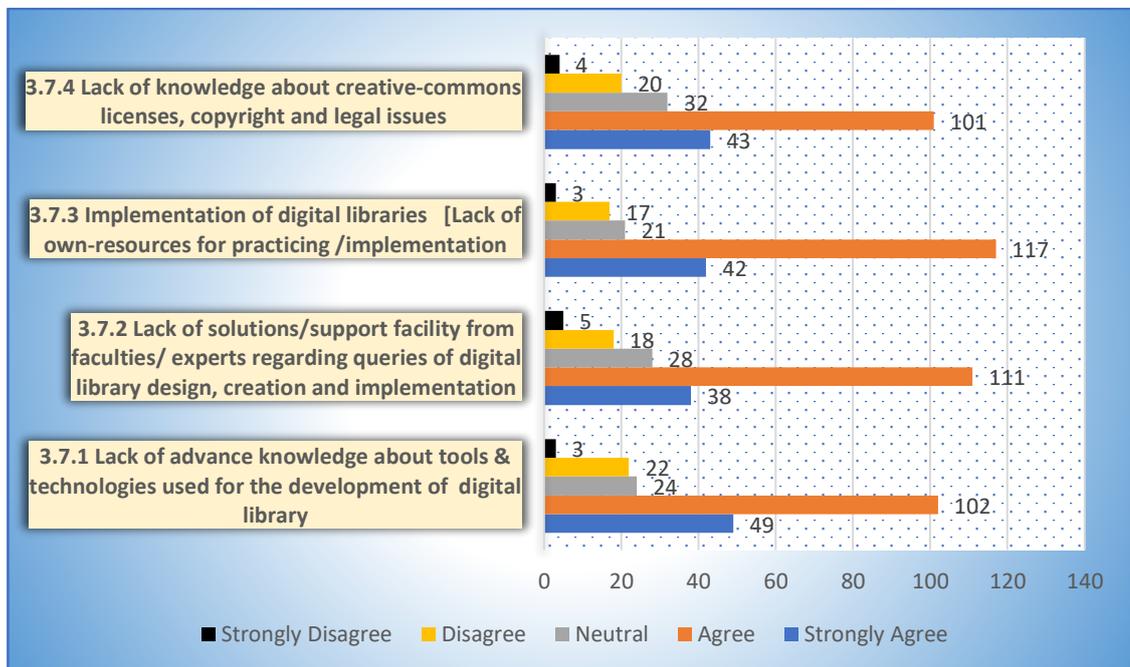


Figure 5.2.18: Graphical Representation of Students/ Learners Attitude Towards Implementation of Digital Libraries

5.2.3.8 Students/ Learners Attitude Towards Learning Outcome and Objectives

An analysis of the data in Table 5.2.14 shows that digital library students/learners attitude towards learning outcome and objectives of digital library courses/programmes. They were asked four questions related to learning outcome and objectives of digital library courses/programmes on which they were to agree or disagree. For the purpose of analysis responses in Table 5.2.14 are clubbed into three groups of combined agreement [Strongly Agree (SA) plus Agree (AG)], combined disagreement [Disagree (DS) plus Strongly Disagree (SD)] and Neutral (NE) in percentages for each statement to highlight dilemmas among groups of professionals.

The statement at 3.8.1, i.e., *“The objective of the training was fulfilled”* has 78.00% respondents in agreement and 4.00% in disagreement while 18.00% were neutral.

The statement at 3.8.2, i.e., *“Covered topics were relevant to digital library”* has 87.50% respondents in agreement and 2.00% in disagreement while 10.50% were neutral.

The statement at 3.8.3, i.e., *“You had only certification requirement instead of learning”* has 37.50% respondents in agreement and 24.00% in disagreement while 38.50% were neutral.

The statement at 3.8.4, i.e., *“Time allotted for the training was not suitable and insufficient”* has 67.00% respondents in agreement and 18.50% in disagreement while 14.50% were neutral.

Hence, from Table 5.2.14 it is clear that a good majority of the digital library students/learners agree upon the questions regarding their desired learning outcome of digital library course/programmes was fulfilled. Figure 5.2.19 shows the graphical representation of the same.

Table – 5.2.14: Students/Learners Attitude Towards Learning Outcome and Objectives

(Total Resp. = 200)

S. No.	Statement	SA	AG	NE	DS	SD
3.8.1	The objective of the training was fulfilled	33	123	36	5	3
		16.50%	61.50%	18.00%	2.50%	1.50%
		CA = 78.00%			CD = 4.00%	

3.8.2	Covered topics were relevant to digital library	40	135	21	4	0
		20.00%	67.50%	10.50%	2.00%	0.00%
		CA = 87.50%			CD = 2.00%	
3.8.3	You had only certification requirement instead of learning	23	52	48	46	31
		11.50%	26.00%	24.00%	23.00%	15.50%
		CA = 37.50%			CD = 38.50%	
3.8.4	Time allotted for the training was not suitable and insufficient	34	100	37	18	11
		17.00%	50.00%	18.50%	9.00%	5.50%
		CA = 67.00%			CD = 14.50%	

SA = Strongly Agree; AG = Agree; NE = Neutral; DA = Disagree; SD = Strongly Disagree; CA. = Combined Agreement; CD = Combined Disagreement.

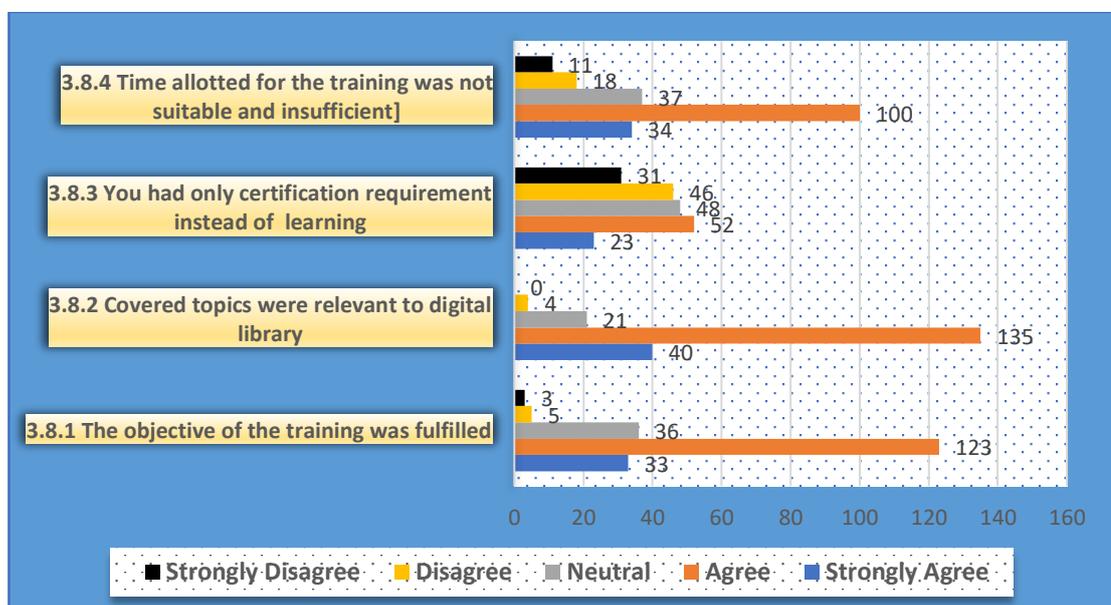


Figure 5.2.19. Graphical Representation of Students/Learners Attitude Towards Learning Outcome and Objectives

5.2.3.9 Students/ Learners Attitude Towards Changing Educational and Training Trends

The below Table 5.2.15 helps in grasping the various aspects related to changing educational and training trends of digital libraries in India. Digital library students /learners were asked five questions related to changing educational and training trends of digital libraries on which they were to agree or disagree. For the purpose of analysis

responses in Table 5.2.15 are clubbed into three groups of combined agreement [Strongly Agree (SA) plus Agree (AG)], combined disagreement [Disagree (DS) plus Strongly Disagree (SD)] and Neutral (NE) in percentages for each statement to highlight different opinions of the respondents on the asked questions.

The statement at 3.9.1, i.e., “*LIS curricula should be changed with rich content of digital libraries*” has 90.00% respondents in agreement and 1.00% in disagreement while 9.00% were neutral.

The statement at 3.9.2, i.e., “*Massive Open Online Courses (MOOCs) will replace traditional teaching system for digital libraries in near future*” has 77.50% respondents in agreement and 10.50% in disagreement while 12.00% were neutral.

The statement at 3.9.3, i.e., “*Opportunities of continuing educational programme (such as: seminar, workshop, conference, short-training courses) in digital libraries should be more*” has 90.00% respondents in agreement and 2.50% in disagreement while 7.50% were neutral.

The statement at 3.9.4, i.e., “*LIS schools should make digital library courses and resources consistent with the needs and expectations of the job market*” has 90.50% respondents in agreement and 2.50% in disagreement while 7.00% were neutral.

The statement at 3.9.5, i.e., “*You still feel the need for more training*” has 86.50% respondents in agreement and 3.50% in disagreement while 10.00% were neutral.

Therefore, from the Table 5.2.15 it can be understood that a majority of the respondents were agree with acceptance of new tools, technologies with the changing educational and training trends for effective education and training for digital libraries. They aspire to become more proficient in quality education on digital libraries in the overall changing scenario of teaching and training. Figure 5.2.20 shows the graphical representation of the same.

Table – 5.2.15: Students/Learners Attitude Towards Changing Educational and Training Trends

(Total Resp. = 200)

S. No.	Statement	SA	AG	NE	DS	SD
3.9.1	LIS curricula should be changed with rich content of digital libraries	82	98	18	2	0
		41.00%	49.00%	9.00%	1.00%	0.00%
		CA = 90.00%			CD = 1.00%	
3.9.2	Massive Open Online Courses (MOOCs) will replace traditional teaching system for digital libraries in near future	51	104	24	17	4
		25.50%	52.00%	12.00%	8.50%	2.00%
		CA = 77.50%			CD = 10.50%	
3.9.3	Opportunities of continuing educational programme (such as: seminar, workshop, conference, short-training courses) in digital libraries should be more	71	109	15	3	2
		35.50%	54.50%	7.50%	1.50%	1.00%
		CA = 90.00%			CD = 2.50%	
3.9.4	LIS schools should make digital library courses and resources consistent with the needs and expectations of the job market	78	103	14	4	1
		39.00%	51.50%	7.00%	2.00%	0.50%
		CA = 90.50%			CD = 2.50%	
3.9.5	You still feel the need for more training	65	108	20	5	2
		32.50%	54.00%	10.00%	2.50%	1.00%
		CA = 86.50%			CD = 3.50%	

SA = Strongly Agree; AG = Agree; NE = Neutral; DA = Disagree; SD = Strongly Disagree; CA. = Combined Agreement; CD = Combined Disagreement.

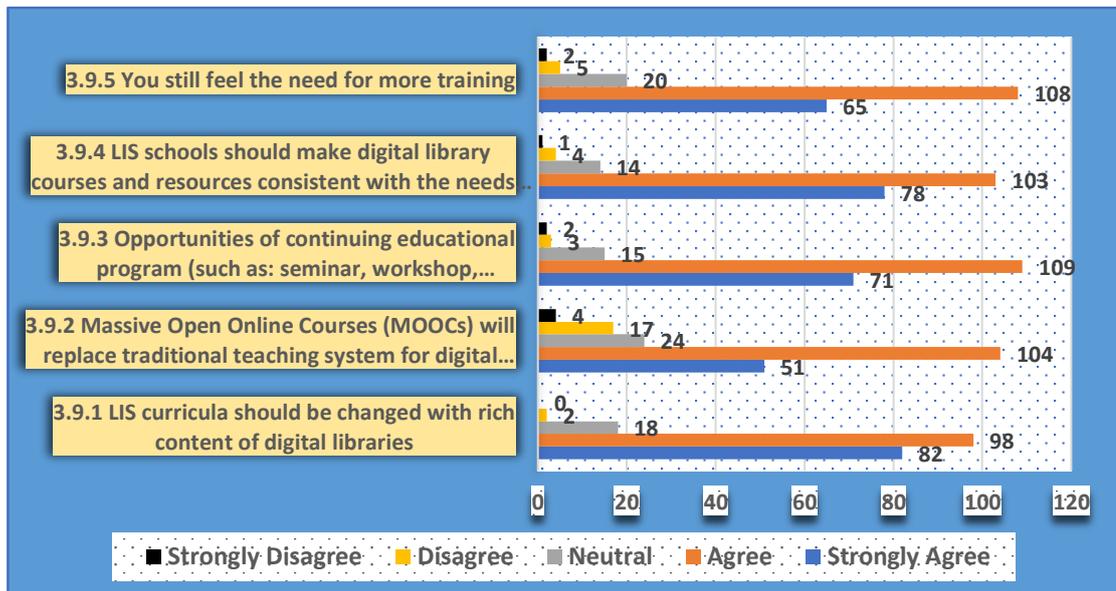


Figure 5.2.20: Graphical Representation of Students/Learners Attitude Towards Changing Educational and Training Trends

5.2.4 Other Challenge(s), which Students/Learners Have Faced in the Training/Course of Digital Libraries

There are many issues, which have been faced by students/learners during attending digital libraries education and training programmes, a descriptive question was asked. The responses received were varied and summarized below:

- *Accommodation*
- *After a brief summary of some key findings related to the digital library-definitions of the digital library are possibly premature and will under represent act eristics they prefer for the different classes of information content they.*
- *After training some type of communication required for solving practical problems while using.*
- *All participants are not equal so according to group of participants, training should be imparted.*
- *All the areas are not covered during the time*
- *Connectivity and subscription amount high*
- *Digital libraries have the potential to offer unprecedented resources for supporting e-learning. Digitization*
- *Digital software not available*

- *Discipline, Accommodation issues, languages problem, teaching method like hands on practice.
most and important all organizer think that this type programme is income sources.*
- *Distance is a matter. Venue is maybe in other state.*
- *Duration of the training programme was very short.*
- *Duration of training*
- *Employer are not allowing the participants to attend such courses.
Most of the serving people attending for their compulsion of promotion. They are spending their own leave and money. It is more tough in case of library professionals. Although there are rules and regulations but no one bother for that. Training program s only become a formality rather than a learning program.*
- *Fees are more expensive*
- *Few people have practical knowledge of digital library.*
- *I Have faced the shortage of the time and duration*
- *implementation of new technologies in traditional libraries*
- *It should be for more training approachable*
- *IT Support is need*
- *knowledge about these courses is very few*
- *Lack of awareness about digital library and digital content*
- *lack of facilities provides such as computer lab and installation*
- *Lack of Hand on practice*
- *Lack of infrastructure in digital libraries*
- *Lack of interest to learn new technology of LIS professionals.*
- *Lack of IT and infrastructural skills*
- *Lack of learner centralized digital library training.*
- *Lack of man power*
- *Lack of qualified teacher in class.*
- *Lack of suitable trainer.*
- *lack of support from Institution*
- *lack of time and lack of going to another city*
- *Lack of time and more specific solutions to doubts*
- *Language of communication / Language problem*

- *Level of Skill and participants*
- *Librarians are not techno savvy. and not aware about opportunities of education and training on digital libraries in India.*
- *Main topics not described.*
- *More of awareness and enriching books on Literature, Language and Cultural Studies are needed*
- *More of practical knowledge*
- *Need more Practical session*
- *Network problem*
- *No any courses arranging in school library*
- *Number of participants limited seat*
- *On digital era we are not connect proper internet faculty and many times on online workshop video and audio are breck, there for many problems.*
- *Only organised in big cities*
- *Only verbal and practical teaching given but No handouts*
- *Our teacher/ mentor themselves don't know what exactly digitisation means I didn't mean they don't know or not capable of I meant what they think about digitisation is not what actually digitisation is according to some people using zoom mail video conferencing Marc and koha is only the mean of digitisation but digitisation is something beyond this.*
- *Permission for participation*
- *Poor training courses now*
- *Positive attitude towards Students*
- *Practice sessions were missing*
- *Remaining Institute are not full support.*
- *Sometime not able to understand the meaning of some words*
- *sometimes technical problems come and also lack of programming awareness which must be taught and incorporated in MLIS course*
- *Technological issue*
- *The main challenge in the training course is live practiced by the participants during course and assignment based practical learning should be introduced in these programmes and assign some marks for certification. so, the training motto will be fulfilled.*
- *The time schedule should have been at least for two weeks with still more practical or hands on training.*

- *The word size in PPT is too small.*
- *There should be one platform that covers all the needs of the library professionals must be centrally operated*
- *There should be Part Time Courses all that.*
- *Time and language*
- *To operate New things*
- *Training should be with more in practical aspect*
- *Training should focus on the level of the participants*
- *Training timing not suitable for a working person.*

5.2.5 Students/Learners Overall Comment about Education and Training for Digital Libraries in the Country

In order to know, their overall comment about education and training for digital libraries in the country, a descriptive question was asked to students/ learners of digital libraries. The responses received were varied and summarized below:

- *Above average*
- *All are very informative, training sessions awesome*
- *All the school and collage libraries should convert their traditional libraries to digital.*
- *Almost all top teaching institutions have their digital library. Most of the University are teaching concept of Digital Library. Many workshops, seminars on Digital Libraries are being organized by different institutions. It's a good initiative.*
- *At national level very limited steps are taken by the government as well as universities to make digital library in real sense. Someone takes interest but most of them ignoring and not in practice to come out of the virtual mode to the real mode.*
- *Best and Excellent*
- *Course arranging in school library*
- *Digital libraries should be improved and all colleges and school must hold a digital library concept in all the places including villages.*
- *Digital Library education and training status is very poor in India.*
- *Education and training for digital libraries should be given more preference in university level.*

- *Education and training for digital libraries" It Is very important thing in India*
- *Education system is changing everything is becoming digital. The libraries and institutions should look at new perspectives and ways to share knowledge Digital libraries have a wide scope.*
- *Everyone learns something at least*
- *Faculty should submit their papers / works so that people can access it without hindrances.*
- *Good at central universities but needs improvement in state universities especially at up state universities*
- *Government has to allot sufficient money, initiate and take care about digital library development.*
- *Hands on training necessary.*
- *I think this topic is very useful for new generation for learning Digital Library*
- *Improvement required*
- *In India it's not popular. If a learner needs knowledge of the digital library, main thing is to attend workshops or short-term training.*
- *In Library science curriculum, instead of imparting only theoretical knowledge, better to impart more of practical knowledge with working in various well-established libraries. University libraries should conduct more training on the development of digital libraries. Fund should be allotted by the Government to organize training programmes. They should be separate fund to the colleges and university libraries to go for digital library. All the state governments should support digital library by conducting training programmes to the librarians, computer teachers and to the technical assistance.*
- *In nascent stage*
- *In this Digital era, Library professional should be well aware and proficient with latest trends and technology in the field of library science and the digital library is one of the major topics.*
- *Integrated learning environments in different countries. Example of a project incorporating a VLE and digital libraries into the learning process. In universities and colleges, libraries offer their catalogues online, many through.*
- *It is accessed by limited group of professionals.*
- *it is mandatory for all under information literacy*
- *It is very essential at present world*
- *It required infrastructure*
- *It should be compulsory as part of professional Education*
- *It was splendid.*

- *Lack of practical and hands on training*
- *Lack of practical knowledge*
- *Lack of update course and infrastructure*
- *Last 5 year we are upgrade in digital library. but not are very high speed. current time many colleges and university library have no library software.*
- *LIS courses should be more digital library oriented and the teachers must have expertise and experience in the domain of digital library not only theoretically but also practically.*
- *Lots of improvement is required*
- *More Practical Training required.*
- *More training has to be given for improving the technical knowledge of the person.*
- *More training programme should be in our country for example open-source software, commercial software, Reference management software, and others softwares*
- *Most of the professionals/institution in some states are imparting training but J&K is providing less importance to professionals in terms of training career development*
- *Need improvement & more perfection*
- *Need more improvement and focused on digital library education*
- *Need to be developed to good extend*
- *Need to be standardised to meet requirements of job market*
- *Need to conduct more training*
- *Need to upgrade*
- *Not satisfactory*
- *Not up to the expectation of learners*
- *Not very good.*
- *Now there are lots of forum and communities and also videos available on YouTube and NPTEL portal. we can learn from there.*
- *One topic clear same day with practical*
- *Only some institute participate in this program benefit to API score*
- *Opportunities of jobs should be more*
- *Overall good*
- *Practical aspects should be dealt properly.*

- *Satisfactory*
- *Should be revised/ Updated/ Improve*
- *The best things is to introduced extensive contents on digital Library in course curricula itself.*
- *The training i attended was very good.*
- *The training should be done during the graduation or PG level...*
- *There are more problems digital facilities in the country. There are remote area students have no internet connection and computer.so in India has are not satisfied with the digital libraries.*
- *These are well and good.*
- *To create Awareness & Ben fits to Explain*
- *Training should be easy and free of cost*
- *Update and upgrade*
- *Very poor, need immediate attention to pay.*
- *We have good syllabus only but not much effective trainer. Still faculties are not much aware about the library technology, theoretically they can speak, practically output is nothing*
- *Yet to be fine tuned*

5.2.6 Students / Learners Suggestions for Betterment of Education and Training on the Digital Library

As a last question, the respondents were asked to give their suggestions for betterment of education and training on the digital library in the country. The responses received from the students / learners for this descriptive question is given below:

- *A separate paper should be there in LIS Curriculum*
- *A Big change is required in the curriculum*
- *All college and university have to improve their digital library, i.e., E-books, E-journal*
- *All the LIS school should have a paper on digital library*
- *Digital library software for practice.*
- *Overall LIS curriculum should be practical oriented.*
- *Traditionally teaching contents should be eliminated.*
- *Appointment of trained, well qualified and regular staff.*

- *Attending workshop/seminar/conference on digital library may be made mandatory to get degree (BLIS & MLIS) and Govt should sponsored to arrange workshop/conference/seminar related to digital library*
- *Awareness is mandatory*
- *Compulsory paper on Digital Libraries - Theory and Practice both*
- *Curriculum of Library science should be reframed*
- *Curriculum based education need*
- *Curriculum should be on the basis of present situation*
- *Curriculum should be on the basis of present situation and hands-on training with proper time schedule required.*
- *Digital libraries are quickly becoming the norm at colleges and universities since they combine technology and information resources to allow remote access to educational content, breaking down the physical barriers. But this is not the only benefit: here are 5 good reasons why teachers and parents should invite children and young learners to use digital libraries*
- *Digital libraries can be improved by the following methods:*
 - * *Institutional founders or managers or members should keep separate fund from the starting of the academic financial year for the purpose of the digital library.*
 - * *A knowledgeable person or "Information Technology Based" Persons should be appointed as the maintainers of the digital library.*
- *Digital Library not use only in any Institute, you may create your personal archival repository for your use.*
- *Duration of courses can be increased*
More hands-on training sessions to be included
More content should be included
- *Each library science department have one doctorate computer science faculty as a compulsory, one management faculty and as their need library science faculties also.*
Frequently monthly once they can conduct a workshop for their students from experts because now a days course fee also increased so as per fee institute can ensure our learning also. And many more ...
- *Education and training opportunities on DL should be more*
- *Education and training programmes should be start*

- *Every state should provide training courses to the aspirants to avoid the wastage of time and money in going to other states*
- *First teach basic computer then give them training of DL*
- *For making Digital India*
- *Frequently practical training*
- *Give more emphasis to practical sessions than theory. After the training programme, visit similar digital libraries in a regular basis. Librarians act as a network.*
- *Good training facilities. Interest of librarians*
- *Good. Create more awareness on digital libraries. Give sufficient training on how to utilize well the digital libraries.*
- *Government Funding*
- *Higher academic institutions should depute their library professionals to attend digital library training programmes/trainings frequently and should organise in house training programme for their employees to make them expert in digital library.*
- *Implementation of education system and internet connection*
- *Improve informal and professional learning*
- *Improve the learning program for the new once*
- *In curricula itself add the module of digital library not theory part.*
- *Increase employment opportunities in this field & give chances to library students not BE. Computer science students.*
- *Infrastructure needs to develop*
- *Internet speed increase*
- *Involve the DSpace in MLISc*
- *It required infrastructure*
- *It required qualified and well trainer*
- *It should be made mandatory for all users*
- *It should be part of curriculum with lots of practical to prepare students for future.*
- *It's happened every month*

- *Language is a barrier for understanding digital libraries to participants*
- *Language is a barrier for understanding digital libraries to students / learners so regional language required in training programs*
- 2. *Affordable Fee of training/course*
- *Librarians should be tech savvy*
- *Library associations and leading organizations should take effective initiatives for improvement of education and training on digital libraries.*
- *LIS leaders should take initiative for development DL education and training*
- *LIS leaders should take initiative for development DL education and training*
- *LIS syllabus needs to be updated regularly in teaching Digital Libraries and more emphasis should be given on Hands on training.*
- *LIS syllabus should be revised according to modern digital environment.*
- *More and more piratical knowledge should be provided to staff.*
- *More and more practical oriented papers are to be included*
- *More conduct during pandemic situation WEBINARs*
- *More Consternate on Digital Library Sources, and how to Implement is very important.*
- *More Practical education*
- *More practical practices necessary*
- *More topics on Digital environment in libraries should be part of curriculum, financial support should be provided to libraries to implement digital libraries.*
- *More trainings and workshops are required.*
- *More workshops have to be done and practical sessions/ tasks have to be given*
- *My suggestion for the improvement digitisation while is to know the skill of your staff try to improve it and do open session regularly with users to let them know what we have what we serve library is just not a place where books are kept, we have to change the mindset of the user's*
- *My suggestion regarding developing digital libraries is that all professionals must be given training for maintaining digital libraries but everywhere in the country there is no disparity between professionals and non-professionals all are on the same platform and those who are having MLIS/BLIs are higher*

*education in the field of library science are somehow well versed in libraries and its operations but needs some training workshops for gaining technical capabilities which is only possible due to education and special hands on training,
UGC/ICTC never framed guidelines nationally so professionals are also in delima*

- *Need effective digital library workshop and course*
- *Need more resources to set up good digital content*
- *Need to be improve*
- *Need to improve and should be implicated practically*
- *Needs more practical knowledge*
- *Networking proper*
- *Offer Incentives for those who attended and benefited. Recognise the training programmes and UGC and other nodal agencies should make it mandatory.*
- *Online training with PPT*
- *People should be made aware of the benefits of digital library*
- *Please continue next webinar for future*
- *Practical activities are more effective than theory*
- *Practical aspects should be dealt properly.*
- *Practical training with course materials at the end of course for follow up*
- *Proper funding, present attitude of the user/professional towards the library*
- *Regular workshops and training facilities should be provided*
- *Resources especially in state universities must be increased.*
- *Syllabus at University level of PG and UG should be changed and include DL course with practical training*
- *Syllabus revise according to need information explore online Learning*
- *Theory and training must go side by side.*
- *There should be a Google based platform for creation of Digital Libraries.*
- *There should be a practical paper on Digital Library in the course curricula, OR introduced the Elective paper on It.*
- *There should be a standard for the digital library created by ILA*

- *There should be more flexibility in course structure specially for LIS professionals.... And of course, frequency of short-term courses should be increase...At least 3 to 4 times in a calendar year...*
- *This was very necessary this time.*
- *Time to time practical training*
- *To allow online courses, e-content with training programme.*
- *To learn any open-source software internet and infrastructure must be good.*
- *To make information in digital form widely available requires supporting rights of access and use, including copyright, preservation of the integrity of the document, licensing, and payment for use.*
- *Topics will be added in curriculum and hands on training should be given to the students.*
- *Training from not only teachers but also training from working professionals also Important. Working professionals also have good knowledge of the software.*
- *Training opportunities on digital library should be more with efficient experts.*
- *Training program charges decide according to student and online training program is more effective.*
- *Training program should be more than two weeks because in one week All the module and customisation are not covered properly so I think two weeks is sufficient for program*
- *Training should be cost effective, more hands-on practical sessions to be conducted*
- *Understanding apply*
- *University curriculum should include DL course with practical lab*
- *Updated course and infrastructure*
- *User Education*
- *Yes, Digital Education is good for this generation for learning*
- *Yes, today a very useful and fast services in digital libraries.*

5.3 Conclusion

Data collected through both questionnaire of faculty/experts and students / learners of digital libraries, has been analysed in this chapter on various aspects concerning to challenges and opportunities in digital library education and training in India, with the help of tables, charts and graphs. As such education and training in digital libraries is the modern time requirement for every LIS professional, irrespective of his age, academic and professional qualification, professional experience, professional role or nature of work, level of position, and so on. From the results obtained from the both survey of faculty/ experts and students / learners, various issues related to the education and training of the digital library were revealed. The survey gives a clear picture regarding various aspects of digital library education and training like its awareness, level, content, limitations, infrastructure and resources, institutional / organizational support, about study and learning material, personal issues of faculty and students, educational and training trends, evaluation system, education and training opportunities, current state of DL education and training in the country, and so on. The faculty/experts of digital libraries have prioritized areas of digital libraries which should be incorporated in the curricula of library and information science schools in the country. Both faculty/experts and students / learners of digital libraries felt that LIS curricula should be change with rich content of digital libraries. LIS students/ learners are interested in getting education and training and look forward for other avenue to keep themselves competent and developed in the area of digital libraries. Both faculty/experts and students / learners of digital libraries in the survey offer very useful suggestions to make digital library education and training more effective and better in the country. It is concluded that the suggestions and results received from the both surveys will have to be included in LIS curricula to betterment and improve the digital library education and training in the country.

CHAPTER – 6

FINDINGS, SUGGESTIONS AND CONCLUSION

6.0 Introduction

Digital library has been one of the core areas of library and Information science education and training in the 21st century. Of course, overall functions and concepts related to traditional libraries have completely changed due to digital libraries. With this, the traditional librarian's qualifications and skills have been changed accordingly to the new concepts and scope of the digital libraries. A good understanding of digital library concepts makes it easy to understand technological changes occurring in the domain of library and information science. Many factors underlie the ongoing transformation that is taking place in digital library education and training in the country.

This chapter summarizes the findings of the study, along with the conclusion and suggestions. The present study is an effort to investigate the “Digital Library Education and Training: A Study of Challenges and Opportunities in India”. The data was collected from the students / learners and faculty / experts of digital libraries in the different parts of the country. There were 280 respondents, i.e., 80 faculty /experts and 200 students / learners of digital library. The researcher has come up with the following conclusions and suggestions after analysing and interpreting the data obtained from the respondents. The key findings of the study were divided into two parts by the researcher, as follows:

6.1 Major Findings of the Study

6.1.1 Overview of Digital Library Education and Training in India

- It is found that the majority of the faculty/experts (i.e., 58.75%) fell in the age group between 36 to 55 years. While the majority of students/learners (i.e., 89.5%) fell in age below 45 years which was natural since the population of the study included the young community, which interested in digital libraries.

- The study reveals that the representation of male respondents both faculty/ experts and students/learners are much more than that of the female respondents who much participated in digital library education and training programmes. It can be concluded that female participation is less than male in digital library education and training in the country.
- It is found that state wise distribution of digital library professionals (responses received) from different states of India was not equally distributed. There may be other reasons for this uneven distribution, which are affected by different factors and can be included in its challenges.
- It is found that majority of 144 (i.e.,72%) students/ learners of digital libraries having master degree in library and information science. That shows that digital library professionals are good professionally educated in the subject. Although 71% digital library professionals are engaged in working in private and government jobs and the majority of 72% respondents having less than 10 years professional/ research experience.
- The concept of digital library is still new. So, it is clear to the Table 5.1.1 that majority of 87.50% respondents were below to 15 years overall teaching experienced young faculty / experts, who have been much interested in the area of digital library education and training. Although 76.50% percent of the respondents are middle and senior level faculty /experts in digital libraries.
- It is clear form Table 5.2.2 majority of 59.50% digital library students/learners are not satisfied with digital library components in the prescribed curriculum at the University level. They feel that digital library components should be rich and advance in LIS curricula. LIS curriculum most of universities have only basic level contents and no practically exposure. Practical aspect is missing to a great extent. The respondents feel the LIS schools fulfil almost all basic requirements of digital things but need to make it easier and more comfortable.
- It is found that there are many opportunities for LIS professionals to import knowledge / creation of digital library after taking the graduation / post-graduation course in library and information science. The responses about it that are summarised as follows: through adopting new technology and helping

the users; short term course, searching tips on google, YouTube and SWAYM portal; work closely with colleagues or working with experience library staff; self-practice; attending workshops, seminars, conferences and short-term training courses in digital library; through providing access to digital resources from the mobile location of the user's; through different digital material; through university library, web sites, free databases and through databases; through senior professionals, internet and books, journals, newsletters etc.; through improving self-skills in practical way; through making digital environment; online through web; MOOCS; through the process and interaction with digital technology and physical, etc.

- It is also clear from Table 5.2.4 that the majority of 88.50% of students/ learners have undergone any additional course, workshop, seminar, or any other educational opportunities to update their knowledge of digital libraries. It was found that majority of 69.5% respondents given highest preference to 'workshops' as most effective continuing education programmes for digital libraries.
- It is found that there may be different sources of motivation and awareness for continuing education programme(s) on digital libraries, such as friends/ colleagues; teachers or mentors; mailing-listserv / Forums; social media platforms (Facebook, WhatsApp, etc.); library / institute websites/blog; library /institute newsletter; newspapers, etc., which inspired to the LIS students/ learners to attend such continuing professional educational programmes to develop their skill and knowledge on digital libraries. It was found from Figure 5.2.9 that majority of 55% respondents given highest preference to 'social media platforms (Facebook, WhatsApp, etc.)' as most effective source of motivation and awareness to attend course / training on digital library.
- It is found that students/ learners have good experience and knowledge of DSpace and Greenstone digital library software and less experience and knowledge on Eprints and Fedora software. There is an opportunity to learn more and update knowledge about other digital library software, like Samvera software; Knimbus software; Omeka software. These softwares also

suggested for creating and developing digital libraries or institutional repositories.

- It is found that participation in digital library education and training has discouraged due to financial issues of students/ learners. It shows from Figure 5.2.11 that majority of 62% respondents have not got any financial assistance for attending such professional development like seminar, conference, workshop, short-term training courses, etc. It can be said that digital Libraries education and training in the country is challenged due to financial and unwillingness of the institution authority.
- It is found that as faculty/ expert's point of view that they were engaged in various kinds of digital library education and training related activity(s), such as: taking classes of digital library-related paper at postgraduate level in the University/College; conducting training programmes/workshops/seminars/conferences on digital libraries; providing support during training programmes/workshops/seminars/conferences on digital libraries; providing technical assistance to students in creation/development of digital libraries; editing publications such as books/newsletters/journals on digital libraries; publishing in digital libraries/ institutional repositories; publishing research articles/manuals/guides on digital libraries; carrying out research work on digital libraries; preparing study learning material/course content on digital libraries; engaging in programming/networking/software side area for digital libraries; creating and maintaining digital libraries; troubleshooting handling in creation and development of digital libraries, etc. It can be seen from Table 5.1.2 that the majority of 72.50% of respondents were involved in taking classes of digital library-related paper at postgraduate level in the University/College. About 50-60% respondents were involved in conducting training programmes/workshops/seminars/conferences on digital libraries with providing support during the such training progrmmes and publishing research articles/manuals /guides on digital libraries and the response rate was below 50% for other digital library education and training-related activity(s).
- It is observed from Table 5.1.5 that all faculty/experts were not satisfied with existed digital library components in LIS syllabi and they would like to change

and feel to improve digital library components in LIS syllabi. Not any respondent was replied against the asked statement. There are some key topics have been taught related to the digital library in the curriculum of Master degree in Indian Universities, such as., digital library components; digitization; digital library initiatives; technical infrastructure; design and development of digital libraries; digital information/resource management digital preservation and achieving; software and hardware for digital libraries; digital library planning and management; issues and challenges in digital libraries. It indicates from Table 5.1.4 that 89.00% of faculty/experts responded with positive reply that they were totally agree with above topics related to the digital library in the curriculum of Master degree in Indian Universities.

- It is found that following topics may be incorporated into the curriculum for the digital library which more than 50% of respondents were agreed upon: metadata, cataloguing, author submission; archiving and presentation; information storage and retrieval; digital objects, composites and packages; intellectual property rights management, privacy, protection (watermarking); database systems; naming, repositories, archives; storage and interchange; hypertext and hypermedia; information models and systems; services (searching, linking, browsing, and so forth). The results have also proved of findings of Pomerantz et al. (2006), Chowdhury and Chowdhury (1999) that suggested the above topics that may be incorporated into the digital library curriculum.

6.1.2 Challenges in Digital Libraries as the Area of Study of Education and Training

Although, the challenges and opportunities cannot be separated from each other. Both can be understood as corresponding to each other. We can understand that wherever challenges are faced, those challenges are also available as opportunities to us. The study found that there are many challenges have been faced by both faculty/ experts and students/ learners that are barriers of accepting Digital Libraries as area of study of education and training. Such related challenges are as follows:

❖ **State of Digital Library Education in India**

Although the digital library topic has been taught in LIS curricula since 2001 in India after recommendations of UGC Model curriculum 2001, but it can be seen that the topic of the digital library has not highlighted as especially in the LIS curricula. It is being taught as small components in a unit of paper at only postgraduate level. There are only a few universities where digital library is being taught as a separate paper. So, it can be partially said from Table 5.1.7 that still, digital library education in India has not risen beyond the initial stage and as a result, there is a shortage of digital library professionals in the country right now. There were majority of respondents in agreement of the statement that digital libraries will be sustainable and much demanded in future and teaching of digital libraries are very essential in LIS curricula.

❖ **Lack of Awareness**

It is found that students / learners were not aware about digital library education and training opportunities like seminar; conference; workshops; short-term training courses, etc. 82.50% faculty/ experts and 78.00% students/learners responded with agree with this issue. It makes a reason for the lack of enough enrolment in digital library education and training in the country. (Table 5.1.9)

❖ **Basic Technological Skills**

Although, students/ learner's basic technological skills which involve in the study and learning of digital library is varied to each other. It is found from Table 5.2.7 that about 50% of students/learners still feel that they have lack knowledge of computer, operating systems (Windows/Linux); lack of practice of browsing and searching on the internet; lack of knowledge about computer networking, and lack of basic knowledge about open-source software digital library. 57.50% of faculty/experts also observed that still students/learners afraid from computer operating /digital library technologies. This is also a big challenge that affected overall digital library education and training at an initial stage in the country.

There are two key facets of DL education: one is the need to priorities skills and competencies including communication and pattern analysis, and the other is the need to better improve technological and knowledge skills for a realistic and effective understanding of digital libraries.

❖ **Infrastructure and Recourses**

It was found that there is an insufficiency of necessary resources related to digital library education and training in India. From Table 5.1.8 and Table 5.2.8 there were the majority of both faculty/experts and students/learners of digital libraries felt that digital library education and training in our country affecting by various issues related to necessary infrastructure and resources like, lack of building infrastructure with necessary facilities and furniture; audio-visual aids (like Projector, Speaker, Mike, Smartboard, teaching aids, etc.; availability of an adequate number of computers and viable internet connection; technical issues of internet bandwidth, power outage, software installation, etc.

❖ **Language of Communication**

We can understand that understanding of language from both sides is very important for communication between teacher and learner. India is a multilingual and multi-cultural country, which is a unique identity of it. There is also the challenge of linguistic diversity which can be seen in digital library education and training in the country also. 67.50% student/learners' respondents were agreed upon their difficulty related to language of communication with their teachers during their digital library education and training.

❖ **Financial Issues and Funding Opportunities**

It is found that both faculty/learners and students/ learners were faced financial related problems for digital library education and training. The majority of 70% of students/learners could not afford their fees and 73.00% of students/learners felt inadequate financial support from the sponsoring bodies for attending the digital library education and training, whereas 78.75% of faculty/experts felt they have not got adequate financial support from the sponsoring bodies for

conducting digital library education and training. It is also found from Figure 5.2.11 that there were very less sponsoring and funding opportunities available for participating in continuing education and training programmes on digital libraries in India. Because 62% of students/ learners were attended digital library education and training at their own expenses.

❖ **Institutional / Organizational Encouragement**

It is found that there were most respondents (i.e., 69.50%), which interested in digital library education and training who have not got proper institutional/organizational support in encouraging and allowing them to participate in digital library training /courses. It is also found that there was a communication gap between training organizer and participant also (Table 5.2.9). Whereas 67.50% of faculty/experts' respondents were felt that they have not got any awards/ rewards for good performance, excellent efforts or initiatives for digital library education and training (Table – 5.1.10).

❖ **Study and Learning Material Issues**

Teachers and learners need study and reading material for their teaching and reading purposes. The reading and study material should be adequate, accurate, quality, and easy to access. It is found that both faculty/experts and students and learners felt lack of study and learning materials on digital libraries in terms of adequacy, accuracy, quality, and accessibility in India. (Table – 5.1.11 and Table – 5.2.10)

❖ **Time Constraint**

The importance of time cannot be denied. it is very important for both situations, i.e., conducting courses by faculty/experts and for attending courses by students/learners in digital libraries. It is found that both faculty/experts and students/learners having felt time constraints on different levels of their situations. 65.00% of faculty/experts were felt lack of time for planning for initiating digital library education and training; 71.50% of students/ learners were felt lack of time for participating in planning for education and training on digital libraries; 66.50% of respondents were felt that all topics / queries

were not covered within that time duration of training / course and 67% of respondents were felt that time allotted for the training was not suitable and sufficient. Although, the teacher's dedication towards education and training was excellent. 80.50% of respondents were agreed that trainer/teacher (s) was/were punctual and regularly taken their classes

❖ **Objectivity of Education and Training**

It cannot be denied that there is digital library education and training is much demanded and important in India. Participants have different objectives towards training. Some want to increase their professional skills, some only desire to get a certificate of training. It is found that 37.50% of respondents attended digital library education and training as only certification requirements instead of learning, but others were interested in it. Learning outcome and objectives of 78.00% of respondents were fulfilled. 87.50% respondents were agreed that covered topics were relevant to digital library.

❖ **Interest of Teaching and Learning**

Self-motivation and personal issues of teachers like self-expertise; updateness; Inability to express ideas or difficulties and teaching interest, affect the overall impact of digital library education and training in the country. It is found that faculty/experts have realized a lack of self-expertise in digital libraries (i.e., 60.00% were agreed) and lack of updates in digital libraries (i.e., 65.00% were agreed). 53.75% were felt the Inability to express ideas or difficulties and 36.25% of faculty/teachers were felt a lack of their teaching interest in digital libraries (Table – 5.1.13).

❖ **Administration and Accreditation**

Top level management and authority like Ministry of Education (previously known as MHRD), University Grants Commission (UGC), Distance Education Bureau (DEB), National Assessment and Accreditation Council (NAAC), etc have an important role to implement any system effectively. Such higher regulatory bodies also provide recognition, promoting, initiating, implementing, ranking and financial support to various courses in the field of

education. It is found that the attitude of such higher education bodies towards digital library education and training has been disappointing so far. The majority 81.25% of faculty/experts' respondents felt lack of administration/institutional support for promoting and initiating digital library education and training and 65.00% of faculty/experts' respondents were agreed with the statement that there is a lack of active role of higher education agencies in curriculum development and accreditation for digital library education and training (Table – 5.1.10).

❖ **Competent Human Resources**

It is found from there is very shortage of trained, competent and committed faculty and technical support staff for digital library education and training in the country. From Table 5.1.12, It can be seen that majority of respondents (i.e., 81.25%) felt that shortage of trained, competent, and committed faculty (experts/trainers) for digital library education and training in India. and 85.00% of respondents felt a lack of technical support staff for the same.

❖ **Wider Intellectual Collaboration**

It is found from Table 5.1.10 and 5.1.12 that there is a lack of collaboration between LIS schools at the national and international level for digital library education and training and a lack of exchange of expertise and experience for digital library also. It is very necessary to collaborate, coordinate, and exchanging expertise and resources between LIS schools at the national level as well as the global level for effective digital library education and training in the country. The majority 80.00% of faculty/experts' respondents felt a lack of collaboration between LIS schools at the national and international level for digital library education and training and lack of exchange of expertise and experience for digital library education and training in India.

❖ **Accessibility of Education and Training**

It is found that digital library education and training in India is also affected due to distance factor as well as networks or internet accessibility. The opportunities to learn about digital libraries are limited to selected cities only. Students from rural areas are deprived of access to such opportunities and are

unable to take advantage of it. There are more problems digital facilities in the country. There are remote area students have no internet connection and computer. So, LIS professionals are not satisfied with the digital libraries as well as India suffers due to disparities across geographic region and political - social status that affects in building good digital libraries in every institute.

❖ **Teaching Methods**

It is found from Table 5.2.12 that interaction with between faculty/experts and students/learners have very fruitful and teaching method was very effective during digital library education and training. From students/learner's point of view, faculty/experts were well knowledgeable, well prepared and expert in area of digital library.

❖ **Evaluation Pattern**

It is found that hands-on practical test was highly recommended for taken as a system of testing and evaluating the students/learner's achievement after digital library education and training. From Table 5.1.15 it is clear that a majority of the respondents were agreed with the asked statements about acceptance of different types of evaluation patterns, i.e., written exam; hands-on practical; oral exam; assignments that should be used as a system of testing and evaluating the students/ learner's achievement. However, 97.50% of respondents were very much agreed with the hands-on practical test to opting as a system of testing and evaluating the students/ learner's achievement.

❖ **Copywrite and Licensing**

It is found that digital library professionals were felt lack of knowledge about creative-commons licenses, copyright and legal issues for implementation of digital libraries (Table 5.2.13). 72.00% of students/learners faced copywrite and licencing related issues during implementing of digital libraries after their education and training.

❖ **Technological Barriers**

It is found that students/learners felt lack advance knowledge about tools & technologies used for the development of digital library. 75.50% respondents

were faced such problems and 79.50% respondents were not capable to arrange their own resources for implementing digital libraries after their education and training. (Table 5.2.13).

❖ **Post-Training Support**

It is found that there is lack of post-training support facility for students/learners after their digital library education and training in the country. It is clear from Table – 5.2.13 that 74.50% of students/learners have not got proper for solutions/support facility from faculties/experts regarding queries of digital library design, creation and implementation after their education and training.

❖ **Need of Revision LIS Curricula**

It is found that LIS curricula should be changed with rich content of digital libraries according to changing educational and training trends. It is proved from Table – 5.2.15 that the most of respondents (i.e., 90.00%) want LIS curricula should be changed with the rich content of the digital libraries.

❖ **Opportunities for Learning and Training**

There are many opportunities like seminar, workshop, conference, short-training courses available for training and learning in India that can be adopted as continuing professional education for digital libraries. The 90% of respondents want such continuing professional education opportunities in digital libraries should be more.

We can understand that today scenario of overall education is moving more towards online education. In this context new concept of Massive Open Online Courses (MOOCs) appears to us. It is proved from Table – 5.2.15 that 77.50% of respondents feel Massive Open Online Courses (MOOCs) will replace traditional teaching systems for digital libraries in near future.

❖ **Expectations from Education and Training**

The study also found that there is only a few Universities/Institutions are offering a separate digital library programme at Certificate or Diploma level in

the country, despite the fact that digital library course content is integrated into bachelor and master courses in LIS. At both the BLIS and MLIS courses, digital library components such as basics of the digital library, digital library software, and digital library initiatives, digitization, etc. The curriculum does not adequately cover the demands of the job market, since some areas such as troubleshooting and problem-solving abilities are absent from the Indian LIS curricula, according to this study, which contrasts what is expected in the job market with what is supplied by LIS departments.

Although, 87.50% students/learners were agreed that covered topics were relevant to digital library during their education and training (Table – 5.2.14). But 90.50% of students/learners' respondents believe that LIS schools should make courses and resources consistent with the needs and expectations of the job market for the betterment of digital library education and training in the country (Table – 5.2.15).

❖ **Research of Digital Libraries**

It is found that research on digital libraries has been very less in India compared to other developed countries like U.K. and U.S. so far. 71.25% of faculty/experts' respondents were agreed that there was a lack of research in digital libraries in India. Whereas, 77.50 respondents felt a lack of their research skills in digital libraries. (Table 5.1.11 and 5.1.12)

6.2 Suggestions and Conclusion

➤ **Continuous Discussion on Curriculum Development of LIS**

UGC recommends changes in course curricula after some period of time, some important committees submitted their reports in 1965, 1993 and 2001, the committees appointed by the UGC study the existing system/ syllabi suggests new ones for inclusion in the syllabi of the library schools. The interval of period of appointment of such committee is larger as the concepts in the subject are changing much faster and requires a continual inclusion of newer concepts in the syllabi much faster.

As such there is a need to develop a mechanism to monitor the newer aspects of the subjects and make recommendations every two-three year for inclusion of

new topics in the syllabi. There should be compulsion on the part of universities to accept changes and incorporate recommendation in the syllabi. It is necessary for the educational system to change its curriculum on a regular basis in order to keep up with the changing needs of digital libraries.

According to the study, LIS curricula should be changed in the future to satisfy the demands of the profession and the times. New innovations are likely to have a major impact on LIS curricula.

Several respondents addressed the revision of LIS curriculum based on the current trends and changing nature of digital libraries. They made the following comments:

“A big change is required in the curriculum”

“Curriculum of Library science should be reframed”

“Traditionally teaching contents should be eliminated”

“Curriculum based education need”

“Curriculum should be on the basis of present situation”

“In curricula itself add the module of digital library not theory part.”

“Curriculum should be on the basis of present situation and hands-on training with proper time schedule required”

“It should be part of curriculum with lots of practical to prepare students for future.”

“LIS syllabus should be revised according to modern digital environment.”

“More topics on Digital environment in libraries should be part of curriculum,

“Overall LIS curriculum should be practical oriented.

“Uniform Curriculum with latest trends and technologies incorporated in the syllabus.

Faculty Development programmes”

“There should be uniformity in LIS curricula across the country. UGC or professional bodies must initiate in this direction.”

“Syllabus at University level of PG and UG should be changed and include DL course with practical training.”

➤ **Employing Advanced Technologies in Digital Library Education and Training**

Technological advances facilitate learner centred education and training, as such newer technologies needs to be employed in teaching of ‘digital libraries’ in library and information science schools in the country. Collaborative Learning, peer-group learning needs to be emphasized, so that a habit of self-learning among learners is developed and learners can keep themselves update with their changing professional needs.

According to the National Education Policy (NEP) 2020 – “Education is fundamental for achieving full human potential, developing an equitable and just society, and promoting national development. Providing universal access to quality education is the key to India’s continued ascent and leadership on the global stage in terms of economic growth, social justice and equality, scientific advancement, national integration, and cultural preservation”

The NEP 2020 emphasised that learning of curriculum and pedagogy in educational institutions should be holistic, integrated, enjoyable, and engaging. When the education of the digital library is adapted according to the recommendations of NEP, inquiry-based, discovery-based, discussion-based, and analysis-based learning should all be emphasised in digital library teaching and training. Key concepts, ideas, applications, and problem-solving will be the emphasis of the programme. Teaching and learning should be participatory, questioning encouraged, and sessions should incorporate student interaction as well as multilingual learning.

It can be suggested that digital library education and training should be vibrant and updated as per current scenario in the country. The training programme should be given more emphasis on learning rather than formality. Govt. should recruit permanent faculty members for digital library training.

➤ **Developing Specialism in Digital Libraries**

There is a need to emphasis education for digital libraries in the syllabi so that new entrants learn ‘digital libraries’ in depth. Digital library is a concept that is

needed and important not only for library professionals but also for other professionals like lawyers, doctors, engineers, journalists, and all. It should be a generic course as well as a core paper on digital libraries in LIS curricula. Different LIS schools should come forward to take the initiative running such generic and core courses on digital libraries in the country. After a brief summary of some key findings related to the digital library-definitions of the digital library are possibly premature and will under represent activities they prefer for the different classes of information content they.

As per the demand of NEP-2020, a generic or skill based and interdisciplinary courses should be run in every subject more prominently. So, there is also a need to develop specialization in digital libraries and a full fledged master degree in 'digital libraries' needs to be started which can cover some important aspects of digital library. In the first year, the learner can study the present papers in the first year, but in the second year he can be taught subjects like: digital knowledge organization; access infrastructure; intellectual property right & digital rights management; metadata, cataloguing, author submission; archiving and presentation; information storage and retrieval; digital objects, composites and packages; privacy, protection (watermarking); database systems; naming, repositories, archives; storage and interchange; hypertext and hypermedia; information models and systems; services (searching, linking, browsing, and so forth), etc. in more depth.

In the first paper (for BLIS or first year of integrated MLIS programme) the learner can understand the basics of digital libraries and develop an understanding of modern library as an upgraded technological aspect of the same. In the second paper (for one-year MLIS or second year of the integrated programme) various advanced digital library techniques need to be studied by the learner so that he can understand to make choices to take an appropriate decision according to situations; visualize the future scenario; integrate resources in the offerings and services, and so on.

Several respondents addressed the demanding of separate or specialized paper on digital libraries in LIS curriculum. They made the following comments:

“A separate paper should be there in LIS Curriculum”

“All the LIS school should have a paper on digital library”

“There should be a practical paper on Digital Library in the course curricula, OR introduced the Elective paper on It.”

“Separate Paper on 'Digital Libraries: Concepts and Practices' having both theoretical and practical knowledge' must be included in MLIS”

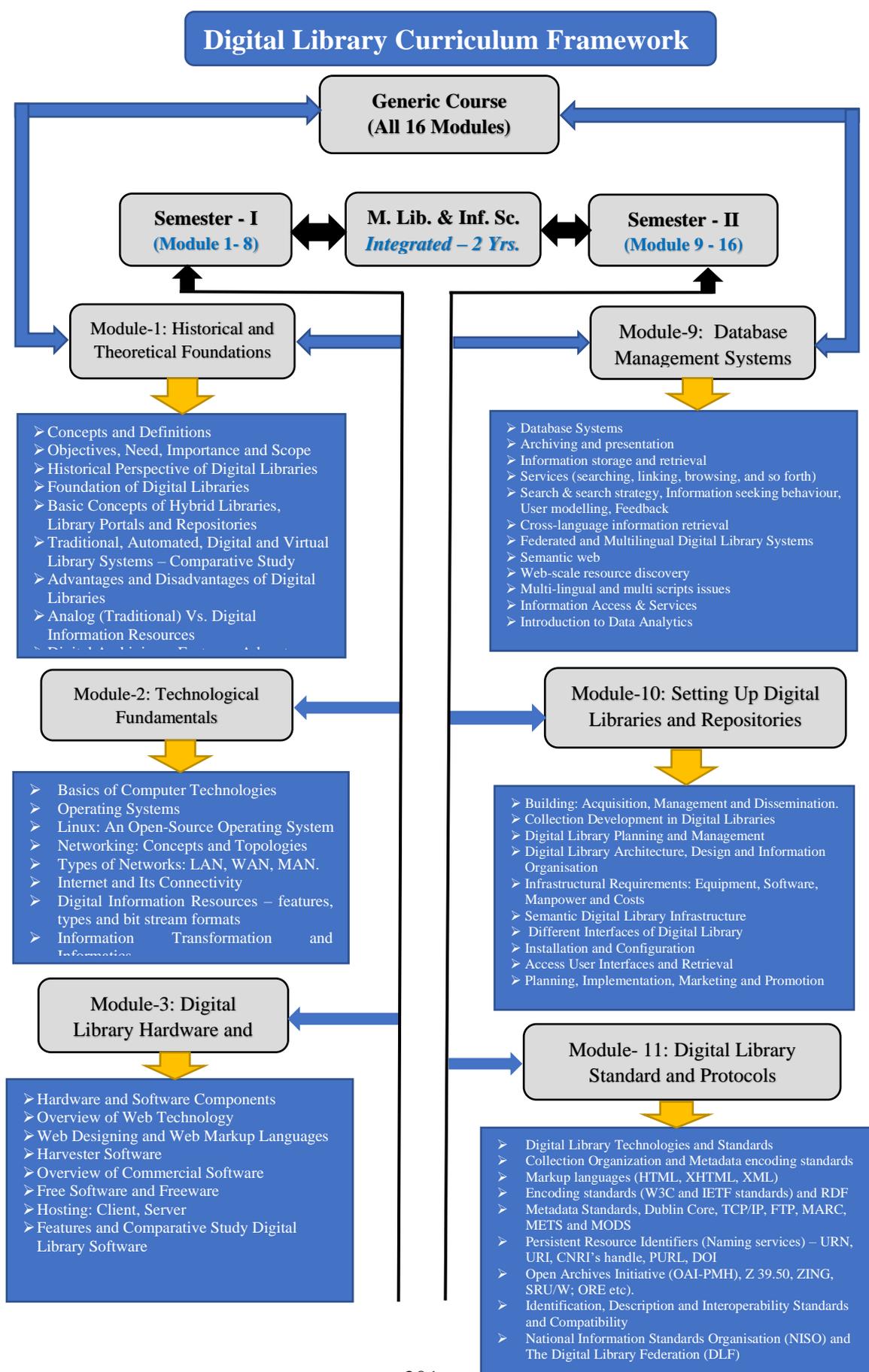
“To start with one comprehensive credit should be introduced both at Bachelor's and “Master’s level besides full-time course -degree or diploma need to be conducted by the well-established schools of India having adequate infrastructure and manpower skills”

“There must be a dedicated paper on digital library (theory and practice both), DLIS university of Jammu has introduced a digital library paper with the forthcoming session in master degree programme.”

Taking classes of digital library related paper at postgraduate level in the University/College and conducting continuing professional development programmes related activities are among the major responsibilities of faculty/experts of digital libraries. Teaching and training responsibilities included coordinating and overseeing digital library programmes, as well as providing guidance and experience in digital library fields, which included cooperation with other library staff members and professionals. In these occupations, trend research is crucial, as is tracking the practice and practices of existing digital libraries

Researcher suggested a **“Framework for Digital Library Curriculum”** with 16 modules for both ‘Generic’ and ‘M. Lib. & Inf. Sc.’- 2 years integrated course. The whole framework of the digital library curriculum has made under the following 16 modules:

➤ **Suggested Framework for Digital Library Curriculum**



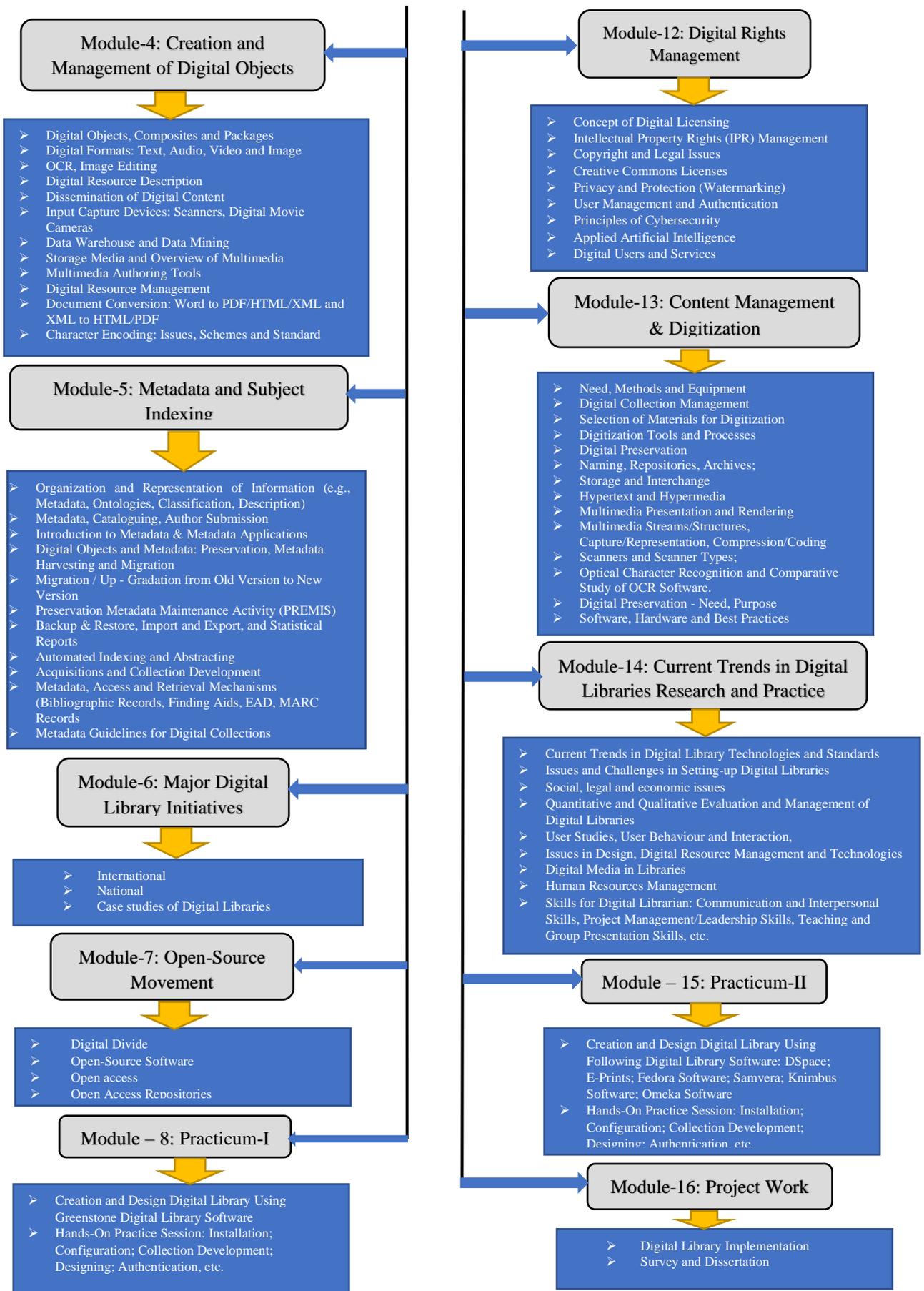


Figure 6.1: Suggested Frameworks for Digital Library Curriculum

- **Need of Skills and Competencies:** Digital libraries are clearly the future of university and research institutions, and digital practitioners will be expected to have a greater scope and depth of experience and expertise in conventional library knowledge, technology, and human relations. Because of the complexities of digital libraries and digital library projects, professional education programmes for digital librarians should emphasis not only technological knowledge and standard library preparation, but also managerial skills, such as design and development of digital libraries and software advance skills gained from hands-on experience with implementation of a digital library project.

Library practitioners must cultivate good interpersonal and team-work skills in addition to the technical skills needed. According to the results of this study, LIS curriculum should focus on additional advance technological and computer networking skills training, as well as the inclusion of professional skills and familiarity in digital collection management and digital technology into curricula.

Several respondents addressed the need of skills and competencies of digital library professional for effective education and training. They made the following comments:

“A knowledgeable person or Information Technology Based Persons should be appointed as the maintainers of the digital library.”

“It required qualified and well trainer”

“Librarians should be tech savvy”

“Training opportunities on digital library should be more with efficient experts.’

“To learn any open-source software internet and infrastructure must be good.’

“LIS courses should be more digital library oriented and the teachers must have expertise and experience in the domain of digital library not only theoretically but also practically”

“There is need of better training of educators and training staff for digital libraries.”

“Provide more practical exposure, More focus on Leadership, Management, Communication, LIS professional and Computer technical skills etc.”

“The LIS professionals must be updated with their technological skills and knowledge so as to cope up with the time and can provide the best services to their clientele.”

- **Sharing Experience and Knowledge:** Educators will benefit greatly from working more closely with digital library experts and exchanging experiences with others in relevant professions.
- Teaching digital library users is a tough endeavour, in part because there are so many different levels of technology involved, as well as so much that is new in terms of production, information, representation, organisation, access, and usage, as well as social, legal, and cultural considerations. The importance of concentrating on digital library education arises from the fact that, as with all other parts of business, education determines the overall quality of the organisation.
- **Separate Group Training:** It is suggested that specialized training courses may enhance the credibility of the respective domain. Because all students are not equal so according to group of participants, training should be imparted. Every student has different learning skills. So, they required personalize education for digital library. Student oriented education should be encouraged.
- **Continuing Education Programmes (CEP):** Education and training is a continuing process of learning. It should move gradually not overnight. Attending continuing education programmes like workshop/seminar/conference/short-term training programmes on digital library may be made mandatory to get degree (BLIS & MLIS).
- **Funding & Sponsorships:** Education and training should be cost effective or affordable and financial support should be provided to students, learners, teachers, experts, professionals and practitioners of digital libraries. Institutional founders or managers or members should keep separate fund from the starting of the academic financial year for the purpose of the digital library. Fund should be allotted by the Government to organize training programmes. All the state

governments should support digital library by conducting training programmes to the students, learners, teachers, librarians, and to the technical assistance.

- **Language of Communication:** National Education Policy 2020 talks about promoting multilingualism and the power of language in teaching and learning. Language should not be a hindrance factor for students / learners to understand digital libraries, so training programmes require a regional language also. Students will be taught in mother tongue, local language and national language only. The rest of the subjects, even if they are English, will be taught as a subject. Simultaneously, the development of study and learning material of digital libraries in regional languages should be emphasized.
- **Interdisciplinary Collaboration:** Educators and professionals are progressively collaborating in the field of digital libraries. There is a need for cross-disciplinary and cross-institutional collaboration for the effective implementation of the digital library curriculum in India. Some comments received from respondents are as follows:

“Each library science department have one doctorate computer science faculty as a compulsory, one management faculty and as their need library science faculties also. Frequently monthly once they can conduct a workshop for their students from experts because now a days course fee also increased so as per fee institute can ensure our learning also. And many more ...”

“Increase employment opportunities in this field & give chances to library students not BE. Computer science students.”

- **Need More Education and Training Opportunities**

In the field of digital library education and training, there should be more opportunities for educators all over the globe to exchange curriculum improvements and come to a shared understanding of core and elective education needs though as with other types of courses. There is a need to put more emphasis on digital library education in India, because it is clear from the findings of the study that present state of digital library education and training is not satisfactory as different levels like qualification-wise, age-wise, professional experience-wise, geographical location-wise, etc. To address the gap as the

modern-day need for LIS professionals, it is suggested that more and more continuing education programmes such as seminars, workshops, conferences, and short-term training courses for digital library education be conducted in India on a regular basis.

Several respondents addressed the increasing frequency of digital library education and training programmes. They made the following comments:

“Need to conduct more and more training and method of these training should be practical oriented”

“Every state should provide training courses to the aspirants to avoid the wastage of time and money in going to other states”

“More workshops have to be done and practical sessions/ tasks have to be given”

“There should be more flexibility in course structure specially for LIS professionals....” and of course, frequency of short-term courses should be increase...at least 3 to 4 times in a calendar year...”

“Training programme should be more than two weeks because in one week All the module and customisation are not covered properly so I think two weeks is sufficient for programme”

“Most of the professionals/institution in some states are imparting training but J&K is providing less importance to professionals in terms of training career development”

➤ **Emphasising Hands-on Practical Education and Training**

The concept of digital library is more technical than traditional library system. It should be better to impart more of practical knowledge with working in various well-established libraries, instead of imparting only theoretical knowledge in LIS curriculum. University libraries should conduct more training on the development of digital libraries.

The education system should be organised and constructed in such a manner that students/learners of digital libraries are fed more practical information rather than theoretical information.

Several favourable comments have received from respondents that addressed emphasising hands-on practical education and training. They made the following comments:

“Give more emphasis to practical sessions than theory. After the training programme, visit similar digital libraries in a regular basis. Librarians act as a network.”

“More and more practical knowledge should be provided to staff.”

“More and more practical oriented papers are to be included”

“Need to improve and should be implicated practically”

“Practical activities are more effective than theory”

“Practical aspects should be dealt properly.”

“Practical training with course materials at the end of course for follow up”

“Topics will be added in curriculum and hands on training should be given to the students.”

“In our department (Gujarat University), we have a separate paper on Digital Information Management where students are trained to use S/W and H/W related to Digital Library with 60 hrs hands-on practice.

Myth of the Digital Library should be removed (people are thinking whatever is available on computer are digital) from student’s mind.

Students should be Digitally Literate from undergraduate level. In the syllabus of Library and Information Science; students should be exposed with digital technology as well as related its hardware and software. Student of LIS should be involved in the creation of Digital content of respective libraries.”

- A "standard" educational model for digital libraries should be expected to combine academic knowledge with hands-on experience using digital libraries.
- More assessments have to be conducted at regular intervals to know about the understanding of the various aspects of digital library education and training with the practical aspects of the syllabus taught and it also helps the students/learners

to understanding with hands-on practice and examples given by the experienced faculty members.

- **In house institutional training:** It is suggested that institutions and organisations should organise in house training programme for their employees to make them expert in digital library. Higher academic institutions should depute their library professionals to attend digital library training programmes/trainings frequently.
- **Awareness:** In this digital era, library professional should be well aware and proficient with latest trends and technology in the field of library science and available education and training opportunities on digital libraries.
- **Role of associations and leading organizations:** Library associations and leading organizations should take effective initiatives for improvement of education and training on digital libraries. Apex educational bodies like Ministry of Education, UGC, AICTE, NAAC, etc. should framed guidelines nationally for development of digital library education and training in the country. Recognise the training programmes and UGC and other nodal agencies should make it mandatory. Policy makers and stakeholders should be encouraged education and training on the digital library in India.
- **Adoptions of innovative pedagogical approaches in education and training:** In LIS programmes, the new pedagogical approach for digital library education places it in the context of information technology. This is comprehensible, considering that the digital library may easily be seen as a symbol of technology and change, which is a prevalent ideological attitude in LIS programmes.
- In this changing modern era of information technology, new innovative experiments should also be included teaching and learning. In this COVID-19 pandemic situation, all educational institutions have been closed. Students and teachers are unable to interact in the traditional classroom during this situation. Online education is being encouraged by the government. UGC has also planned to adopting the blended mode of teaching. It was decided that higher education institutions (HEIs) should be allowed to teach to 40% of syllabus of each course (other than SWAYAM course) through online mode and remaining 60% syllabus of the concerned could be taught offline mode. Examination for both

40% online and 60% teaching can be conducted offline mode. It is recommended that education and training for digital library should be conducted in blended mode and online mode with new tools and technologies and it should be encouraged also.

Several respondents addressed the online education and adopting new tools and technologies in digital library education and training. They made the following comments:

“Training programme charges decide according to student and online training programme is more effective.”

“More conduct during pandemic situation Webinars”

“Online training with PPT”

“There should be a Google based platform for creation of Digital Libraries.”

“To allow online courses, e-content with training programme.”

➤ **Further Scope of Research**

Faculty/experts and students/learners of digital libraries were the only ones who took part in our survey. To validate our conclusions, it can be conducted a similar survey in other categories of respondents and occupations, such as government, corporate, and public sector digital library practitioners.

It is suggested that digital library related teaching, research and training infrastructure needs to be strengthened in the country. A similar research on individual components of a digital library system would be beneficial to clarify the similarities and disparities in requisite challenges and opportunities. We could benefit from current digital library experience and better train potential information professionals by undertaking such a report, which will help us define key competencies required for digital librarians.

Therefore, based on the results of the study, it is recommended that Library and information profession and LIS schools and the profession at large must identify the job requirements for LIS professionals and re-assessment and re-structure the curricula in line with the market demand. Importance should be given to

essential areas of digital libraries, content management, advance technological skills that would give LIS students and professionals an opportunity to work in digital libraries. LIS schools in India need either to reorganize the present curricula or introduce new courses in digital libraries for the impartment of digital library education and training to LIS students. Besides the involvement of LIS schools in digital library education and training, professional associations, and organizations, such as Indian Library Association, Indian LIS Schools, INFLIBNET Centre and NISCAIR, may introduce special courses on digital libraries and increase continuing professional development education programmes like seminars, conferences, short-term training programmes and workshops for LIS professionals to impart competencies in digital libraries. As no empirical study on the gap between challenges and opportunities for digital librarians and impartment of digital library education and training by LIS Schools in India has been carried out before, this study fills this gap, and its findings can be considered as a reference point for restructuring LIS education and revision of curricula as market demand of digital libraries.

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Appendixes

Appendix – I

Research Questionnaire for Faculty/Experts of Digital Libraries

Research Questionnaire for LIS Teachers/Experts of Digital Libraries

Respected Sir/Madam,

Greetings!

I am Vijendra Kumar, Research Scholar, Department of Library and Information Science, Vardhman Mahaveer Open University, Kota. I am doing my doctoral research under the guidance of Prof. (Dr.) Dinesh K. Gupta, Ex-Professor in Library and Information Science, Vardhman Mahaveer Open University, Kota (Presently working as Professor in Library and Information Science, Central University of Haryana, Haryana)

This questionnaire will be used as a tool to survey my research work entitled "DIGITAL LIBRARY EDUCATION AND TRAINING (A Study of Challenges and Opportunities in India)". For the purpose of research, I am in the process of collecting the data from the teachers/trainers/ experts who have been involved in imparting education/training to LIS professionals in the country. The data or information provided by you will be kept confidential & will be used only for research work. It is my humble request to you to do the needful in this regard.

Without your cooperation / support my research will be incomplete, hence I request you to help me in carrying out my research by responding to the questionnaire at the earliest.

Thank you for your kind co-operation.

Yours Sincerely

VIJENDRA KUMAR
Research Scholar
Department of Library and Information Science
Vardhman Mahaveer Open University, Kota

*Required

1. Email *

1. Personal Information

2. 1.1 Your Name (optional):

3. 1.2 Age Group (in years) *

Mark only one oval.

Below to 35

36-45

46-55

55 to Above

4. 1.3 Gender *

Mark only one oval.

Male

Female

5. 1.4 State (You belong to): *

Mark only one oval.

- Andhra Pradesh
- Arunachal Pradesh
- Assam
- Bihar
- Chhattisgarh
- Goa
- Gujarat
- Haryana
- Himachal Pradesh
- Jharkhand
- Karnataka
- Kerala
- Madhya Pradesh
- Maharashtra
- Manipur
- Meghalaya
- Mizoram
- Nagaland
- Odisha
- Punjab
- Rajasthan
- Sikkim
- Tamil Nadu
- Telangana
- Tripura
- Uttar Pradesh
- Uttarakhand
- West Bengal
- Andaman and Nicobar Islands
- Chandigarh
- Dadra and Nagar Haveli and Daman and Diu
- Delhi

- Jammu and Kashmir
- Ladakh
- Lakshadweep
- Puducherry

2. General background information

6. 2.1 Your Teaching experience (in years): *

Mark only one oval.

- Less than 5 year
- 5 to 10 years
- 10 to 15 years
- More than 15 years

7. 2.2 How long have you been interested in the area of digital library training? *

Mark only one oval.

- Less than 5 year
- 5 to 10 years
- 10 to 15 years
- More than 15 years

8. 2.3 Kindly state your role as a professional involved in digital libraries education/ training or development: *

Mark only one oval.

- Senior Level
- Middle Level
- Lower Level
- Other: _____

9. 2.4 Kindly specify the digital library education and training related activity(s) that you have undertaken? *

Tick all that apply.

- Taking classes of digital library related paper at postgraduate level in the University/College
- Conducting training programmes /workshops / seminars / conferences on digital libraries
- Providing support during training programmes / workshops / seminars / conferences on digital libraries
- Providing technical assistance to students in creation / development of digital libraries
- Editing publications such as books/ newsletters/journals on digital libraries
- Publishing in digital libraries/ institutional repositories
- Publishing research articles / manuals /guides on digital libraries
- Carrying out research work on digital libraries
- Preparing study learning material /course content on digital libraries
- Engagging in programming / networking / software side area for digital libraries
- Creating and maintaining digital libraries
- Trouble shooting handling in creation and development of digital libraries

Other: _____

10. 2.5 Kindly state your specialized training/education in digital library area: *

3. Perception of digital library education in the country-I

11. 3.1 Are you in agreement with the following topics related to the digital library in the curriculum of Master degree in Indian Universities? *

Mark only one oval per row.

	Yes	No
Digital Library Components	<input type="radio"/>	<input type="radio"/>
Digitization	<input type="radio"/>	<input type="radio"/>
Digital Library Initiatives	<input type="radio"/>	<input type="radio"/>
Technical Infrastructure	<input type="radio"/>	<input type="radio"/>
Design and Development of Digital Libraries	<input type="radio"/>	<input type="radio"/>
Digital Information/Resource Management	<input type="radio"/>	<input type="radio"/>
Digital Preservation and Achieving	<input type="radio"/>	<input type="radio"/>
Software and Hardware for Digital Libraries	<input type="radio"/>	<input type="radio"/>
Digital Library Planning and Management	<input type="radio"/>	<input type="radio"/>
Issues and Challenges in Digital Libraries	<input type="radio"/>	<input type="radio"/>

12. 3.2 Do you consider that LIS Courses need improvement so far digital library component is concerned? *

Mark only one oval.

Yes

No

13. 3.3 Please select topics from the list below that may be incorporated into the curriculum for the digital library. Please suggest additional topic(s): *

Tick all that apply.

- Information models and systems
- Database systems
- Data modeling
- Transaction processing
- Information storage and retrieval
- Hypertext and hypermedia
- Storage and interchange
- Digital objects, composites, and packages
- Metadata, Cataloging, author submission;
- Naming, repositories, archives;
- Spaces (conceptual, graphical, 2/3D, VR)
- Architectures (agents, buses, wrappers/mediators, interoperability)
- Services (searching, linking, browsing, and so forth)
- Intellectual property rights management, privacy, protection (watermarking)
- Archiving and presentation

Other: _____

14. 3.4 How do you perceive digital library education and training in India? *

3.4.1
General*Mark only one oval per row.*

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Digital library education is in its beginning phase in India	<input type="radio"/>				
Teaching of digital libraries are very essential in LIS curricula	<input type="radio"/>				
Digital libraries will be sustainable and much demanded in future	<input type="radio"/>				
Shortage of digital library professionals in India	<input type="radio"/>				

15. 3.4.2 Infrastructure and recourses *

Mark only one oval per row.

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Lack of building infrastructure with necessary facilities and furniture	<input type="radio"/>				
Lack of audio-visual aids (like Projector, Speaker, Mike, Smart board, teaching aids etc.)	<input type="radio"/>				
Computer labs are not well equipped (availability of adequate number of computers and viable internet connection)	<input type="radio"/>				
Sometimes technical problems occur (like such as internet bandwidth, power outage, software installation, etc)	<input type="radio"/>				

16. 3.4.3 Students / learners issues *

Mark only one oval per row.

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Students / learners have lack of awareness about digital library education and training opportunities	<input type="radio"/>				
Lack of enough enrollment in the training / courses	<input type="radio"/>				
Students / learners afraid from computer operating /digital library technologies	<input type="radio"/>				
Language is a barrier for understanding digital libraries to students / learners	<input type="radio"/>				
Students / learners have lack of interaction and communication skills	<input type="radio"/>				

17. 3.4.4 Administration, accreditation and financial issues *

Mark only one oval per row.

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Lack of administration /institutional support for promoting and initiating digital library education and training	<input type="radio"/>				
Lack of active role of higher education agencies (MHRD, UGC, DEB, NAAC, etc.) in curriculum development and accreditation for digital library education and training	<input type="radio"/>				
Lack of collaboration between LIS schools at National and International level for digital library education and training	<input type="radio"/>				
No awards/ rewards for good performance, excellent efforts or initiatives	<input type="radio"/>				
Lack of Funding opportunities (Inadequate financial support from the sponsoring bodies)	<input type="radio"/>				

18. 3.4.5 Study and learning material *

Mark only one oval per row.

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Lack of teaching material and courses for teachers in the fields of digital libraries	<input type="radio"/>				
Course content on the digital library having less quality in terms of accuracy, understanding, and reading	<input type="radio"/>				
Lack of enough content in indigenous languages on digital libraries	<input type="radio"/>				
Lack of research in digital libraries in India	<input type="radio"/>				

19. 3.4.6 Faculty / Human resource *

Mark only one oval per row.

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Shortage of trained, competent and committed faculty (experts/trainers)	<input type="radio"/>				
Lack of technical support staff for digital libraries	<input type="radio"/>				
Lack of their research skills in digital libraries	<input type="radio"/>				
Lack of exchange of expertise and experience for digital library education and training	<input type="radio"/>				

20. 3.4.7 Self-Motivation and personal issues *

Mark only one oval per row.

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Lack of time for planning for initiating digital library education and training	<input type="radio"/>				
Lack of self-expertise in digital libraries	<input type="radio"/>				
Realizing lack of updateness in digital libraries	<input type="radio"/>				
Inability to express ideas or difficulties	<input type="radio"/>				
Lack of teaching interest in digital libraries	<input type="radio"/>				

4. Perception of digital library education and training in the country-II

21. 4.1 Which particular method(s) do you follow during the training / courses of digital library? *

Tick all that apply.

- Lecture Method
- Classroom Discussion Method
- Assignment Method
- Demonstration Method
- Seminar Method
- Question-Answer Method

Other: _____

22. 4.2 How do you perceive digital library education and training in India regarding evaluation and changing trends? *

4.2.1
Evaluation
pattern
Mark only one oval per row.

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Written exam should be taken as a system of testing and evaluating the learners achievement	<input type="radio"/>				
Hands-on practical test taken as a system of testing and evaluating the learners achievement	<input type="radio"/>				
Oral exam should be taken as a system of testing and evaluating the learners achievement	<input type="radio"/>				
Assignment should be given for testing and evaluating the learners achievement	<input type="radio"/>				

23. 4.2.3 Changing educational and training trends *

Mark only one oval per row.

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
LIS curricula should be change with rich content of digital libraries	<input type="radio"/>				
Massive Open Online Courses (MOOCs) will replace traditional teaching system for digital libraries in near future	<input type="radio"/>				
Opportunities of continuing educational program (such as: seminar, workshop, conference, short-training courses) in digital libraries should be more	<input type="radio"/>				
LIS schools should make courses and resources consistent with the needs and expectations of the job market.	<input type="radio"/>				

24. 4.3 How do you evaluate the importance of the resources for the purpose of effective education and training on digital libraries? *

[0] - Not important at all; [1] - Of little importance; [2] - Of average importance; [3] - Very important; [4] - Absolutely essential

Mark only one oval per row.

	[0]	[1]	[2]	[3]	[4]
<input type="radio"/> Course content of digital library in the curriculum at UG/PG level in the University	<input type="radio"/>				
<input type="radio"/> Continuing training programs (Workshops/Seminars/Conferences/Short-term training courses)	<input type="radio"/>				
<input type="radio"/> Massive Open Online Courses (MOOCs)	<input type="radio"/>				
<input type="radio"/> Webinars/ Live sessions	<input type="radio"/>				
<input type="radio"/> Training packages/ Guides/Manuals	<input type="radio"/>				
<input type="radio"/> YouTube videos	<input type="radio"/>				
<input type="radio"/> Offline CD/DVDs	<input type="radio"/>				
<input type="radio"/> E-Books/Open Archives	<input type="radio"/>				
<input type="radio"/> Research Journals/proceedings	<input type="radio"/>				
<input type="radio"/> Open Educational Resources	<input type="radio"/>				

25. If any other resources (Kindly mention):

26. 4.4 Your overall comment about education and training for digital libraries in the country (in reference to challenges and opportunities): *

27. 4.5 Give your suggestions for betterment of education and training on the digital library: *

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Appendix – II

Pre-Questionnaire for Active Group of Digital Library Professionals

Pre-Questionnaire for Active Group of Digital Library Professionals

Please fill your details:

***Required**

1. Email *

2. Your Name: *

3. Mobile No.: *

4. Destination: *

Mark only one oval.

LIS Student

Research Scholar

LIS Professional

Other: _____

5. University/ Institute/ Organization *

6. Your State *

Mark only one oval.

- Andhra Pradesh
- Arunachal Pradesh
- Assam
- Bihar
- Chhattisgarh
- Goa
- Gujarat
- Haryana
- Himachal Pradesh
- Jharkhand
- Karnataka
- Kerala
- Madhya Pradesh
- Maharashtra
- Manipur
- Meghalaya
- Mizoram
- Nagaland
- Odisha
- Punjab
- Rajasthan
- Sikkim
- Tamil Nadu
- Telangana
- Tripura
- Uttar Pradesh
- Uttarakhand
- West Bengal
- Andaman and Nicobar Islands
- Chandigarh
- Dadra and Nagar Haveli and Daman and Diu
- Delhi

- Jammu and Kashmir
- Ladakh
- Lakshadweep
- Puducherry

7. Have you participated in any BASIC-training program (seminar/conference /Workshop/ short term training course, etc.) in digital libraries ever before? or Have you learned about digital libraries during BLIS/MLIS at the University level? (Yes/No)". *

Mark only one oval.

- Yes
- No

This content is neither created nor endorsed by Google.

Google Forms

Appendix – III

Research Questionnaire for Students/Learners of Digital Libraries

Research Questionnaire for Students/Learners of Digital Library

Respected Sir/Madam,

Greetings!

I am Vijendra Kumar, Research Scholar, Department of Library and Information Science, Vardhman Mahaveer Open University, Kota. I am doing my doctoral research under the guidance of Prof. (Dr.) Dinesh K. Gupta, Ex-Professor in Library and Information Science, Vardhman Mahaveer Open University, Kota (Presently working as Professor in Library and Information Science, Central University of Haryana, Haryana)

This questionnaire will be used as a tool to survey my research work entitled "DIGITAL LIBRARY EDUCATION AND TRAINING (A Study of Challenges and Opportunities in India)". For the purpose of research, It is requested to kindly fill in the questionnaire in order to understand the various aspects of digital library education and training in India, opportunities by the way of new development and challenges faced managing in a better future. The data or information provided by you will be kept confidential & will be used only for research work. It is my humble request to you to do the needful in this regard.

Without your cooperation / support my research will be incomplete, hence I request you to help me in carrying out my research by responding to the questionnaire at the earliest.

Thank you for your kind co-operation.

Yours Sincerely

VIJENDRA KUMAR
Research Scholar
Department of Library and Information Science
Vardhman Mahaveer Open University, Kota

*Required

1. Email *

1. Personal Information

2. 1.1 Your Name (Optional)

3. 1.2 Age Group (Years) (Please tick ✓) *

Mark only one oval.

Below to 35

36 - 45

46 - 55

56 to above

4. 1.3 Gender *

Mark only one oval.

Male

Female

5. 1.4 State (You belong to): *

Mark only one oval.

- Andhra Pradesh
- Arunachal Pradesh
- Assam
- Bihar
- Chhattisgarh
- Goa
- Gujarat
- Haryana
- Himachal Pradesh
- Jharkhand
- Karnataka
- Kerala
- Madhya Pradesh
- Maharashtra
- Manipur
- Meghalaya
- Mizoram
- Nagaland
- Odisha
- Punjab
- Rajasthan
- Sikkim
- Tamil Nadu
- Telangana
- Tripura
- Uttar Pradesh
- Uttarakhand
- West Bengal
- Andaman and Nicobar Islands
- Chandigarh
- Dadra and Nagar Haveli and Daman and Diu
- Delhi

- Jammu and Kashmir
- Ladakh
- Lakshadweep
- Puducherry

6. 1.5 Level of Education *

Tick all that apply.

- BLISc
- MLISc
- M. Phil.
- Ph.D.
- Any qualification in digital library

Other: _____

7. 1.6 Employment status: *

Mark only one oval.

- Govt. Employee
- Private Employee
- Researcher
- Student
- Other: _____

8. 1.7 Professional / Research Experience *

Mark only one oval.

- Less than 5 year
- 5 to 10 years
- 10 to 15 years
- More than 15 years

2. General/Background Knowledge

9. 2.1 Are you satisfied with the components of the digital library in the prescribed curriculum at the University level? *

Mark only one oval.

Yes

No

10. If yes, please mention their level, content, limitations, etc. :

11. 2.2 After taking the graduation / post-graduation course in library and information science, how were you prepared to import knowledge / creation of digital library? Please describe: *

12. 2.3 Have you undergone any additional course, workshop, seminar, or any other educational opportunities to update your knowledge of digital libraries? *

Mark only one oval.

Yes

No

13. If yes, please mention the topics covered:

14. If No, please specify reasons:

15. 2.4 Which type of continuing education programme (s) on digital libraries, you have participated in? *

Tick all that apply.

- Certificate Course
- Short-term training Program
- Workshop
- Seminar
- Conference

Other: _____

16. 2.5 How did you get motivated and heard about the course / training on digital library that you have participated in? *

Tick all that apply.

- Through friends/ colleagues
 Through teachers or mentors
 Through mailing-listserv / Forums
 Through social media platforms (Facebook, whatsapp, etc.)
 Through library / institute websites/blog
 Through a library /institute newsletter
 Through Newspaper

Other: _____

17. 2.6 How do you feel your experience and knowledge about the following digital library software(s): *

Mark only one oval per row.

	Poor	Fair	Average	Good	Excellent
<input checked="" type="radio"/> Dspace	<input type="radio"/>				
<input checked="" type="radio"/> Greenstone Digital Library Software	<input type="radio"/>				
<input checked="" type="radio"/> E-Prints	<input type="radio"/>				
<input checked="" type="radio"/> Fedora	<input type="radio"/>				

18. If you have experience and knowledge of any other digital library software (s), please mention: *

19. 2.7 You availed continuing education and training programs on digital libraries by: *

Mark only one oval.

- Self-expenses
- Sponsored by your working Institute
- Sponsored by organizing Institute
- Sponsored by other assistance bodies
- Other: _____

3. Attitude of participants regarding digital library education and training in India:

3.1 How do you perceive on attending training/course on digital libraries?

20. I. General *

Mark only one oval per row.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Still lack of basic knowledge of computer, operating systems (Windows/Linux)	<input type="radio"/>				
Still lack of practice of browsing and searching on internet	<input type="radio"/>				
Still lack of knowledge about computer networking	<input type="radio"/>				
Still lack of basic knowledge about open source softwares of digital library	<input type="radio"/>				

21. II. Infrastructure and resources *

Mark only one oval per row.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Lack of building infrastructure with necessary facilities and furniture	<input type="radio"/>				
Lack of audio-visual aids (like Projector, Speaker, Mike, Smart board, teaching aids etc.)	<input type="radio"/>				
Computer labs are not well equipped (availability of adequate number of computers and viable internet connection)	<input type="radio"/>				
Sometimes technical problems occur (such as: internet bandwidth, power outage, software installation, etc)	<input type="radio"/>				

22. III. Institutional / organizational support *

Mark only one oval per row.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Lack of institutional / organizational support in encouraging and allowing you to participate in digital library training /course	<input type="radio"/>				
There is a communication gap between training organizer and participant	<input type="radio"/>				
Lack of Funding opportunities (Inadequate financial support from the sponsoring bodies)	<input type="radio"/>				

23. IV. Study and learning material *

Mark only one oval per row.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Lack of availability of adequate updated and rich course content on digital libraries	<input type="radio"/>				
Course content on the digital library having less quality in terms of accuracy, understanding, and reading	<input type="radio"/>				
Lack of enough content in indigenous languages on digital libraries	<input type="radio"/>				
Problem faced in accessing course content via online or offline mode	<input type="radio"/>				

24. V. Personal issues of students / learners *

Mark only one oval per row.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Lack of awareness about digital library education and training opportunities	<input type="radio"/>				
Language is a barrier for understanding digital libraries to students / learners	<input type="radio"/>				
Fee of training/course was not affordable	<input type="radio"/>				
Lack of time for planning for education and training on digital libraries	<input type="radio"/>				

25. VI. Teacher/ trainer's attitude *

Mark only one oval per row.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The teacher/ trainer/ (s) was/were well knowledgeable, well prepared and expert in area of digital library.	<input type="radio"/>				
Training / lecture method was effective and interaction with trainer / teacher (s) was/were very fruitful.	<input type="radio"/>				
During the training / course trainer / teacher (s) was/were punctual and regular taken their classes.	<input type="radio"/>				
All topics / queries were not covered within that time duration of training / course	<input type="radio"/>				

26. VII. Implementation of digital libraries *

Mark only one oval per row.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Lack of advance knowledge about tools & technologies used for the development of digital library	<input type="radio"/>				
Lack of solutions/support facility from faculties/ experts regarding queries of digital library design, creation and implementation	<input type="radio"/>				
Lack of own-resources for practicing /implementation	<input type="radio"/>				
Lack of knowledge about creative-commons licenses, copyright and legal issues	<input type="radio"/>				

27. VIII. Learning outcome and objectives *

Mark only one oval per row.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The objective of the training was fulfilled	<input type="radio"/>				
Covered topics were relevant to digital library	<input type="radio"/>				
You had only certification requirement instead of learning	<input type="radio"/>				
Time allotted for the training was not suitable and insufficient	<input type="radio"/>				

28. IX. Changing educational and training trends *

Mark only one oval per row.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
LIS curricula should be changed with rich content of digital libraries	<input type="radio"/>				
Massive Open Online Courses (MOOCs) will replace traditional teaching system for digital libraries in near future	<input type="radio"/>				
Opportunities of continuing educational program (such as: seminar, workshop, conference, short-training courses) in digital libraries should be more	<input type="radio"/>				
LIS schools should make digital library courses and resources consistent with the needs and expectations of the job market.	<input type="radio"/>				
You still feel the need for more training	<input type="radio"/>				

29. 3.2 Any other challenge(s), which you have faced in the training/course of digital libraries. Please describe: *

30. 3.3 Your overall comment about education and training for digital libraries in the country: *

31. 3.4 Give your suggestions for the improvement of education and training on digital libraries? *

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Research Paper Publications

(In UGC Approved List of Journals)

S. No.	Title	Journal	Author(s)	Year	Vol. No.	Issue No.	Page No.
1.	Continuing Professional Education on Digital Library in India: A Study	<i>Annals of Library and Information Studies</i>	Vijendra Kumar and Dinesh K. Gupta	2016	63	3	203-214
2.	Role of NISCAIR in Professional Development on Digital Libraries	<i>World Digital Libraries: An International Journal</i>	Vijendra Kumar and Dinesh K. Gupta	2017	10	2	133-146

Continuing professional education on digital library in India: a study

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The paper examines development of continuing professional education on digital library in India based on the announcement of postings on LIS-Forum related to seminars, conferences, workshops and short-term training programs on digital libraries held in India during April 2003 to October 2015. The paper finds that 73 continuing professional development programs were held on digital library in India during the period. Due to the increasing amount of information available in digital format, education and training for digital libraries has become necessary. There is a need to hold more continuing professional development opportunities on digital libraries in India.

Keywords: Digital libraries; Continuing professional education; Education and training; LIS-Forum; Seminar; Workshops; Conferences; Short-term training courses; Professional development opportunities

Introduction

Education and training is essential for updating our knowledge and has come to be recognized as a lifelong process. Continuing professional education is very essential to shape and update professional skills and competencies. Digital library is an important area of education and research for library and information science professionals. That traditional print based libraries are making way for digital libraries is now apparent and it is matter of time that digital libraries would become the predominant source of information. However, the transitioning from print to digital libraries has been mired in myriad issues including technological, sociological, ethical, managerial and so on. Many of the issues have been addressed at different levels in various parts of the world. Improving competencies and digital library skills of LIS professionals through continuing training programs is an important area.

Although the tools and technologies with regard to the creation of digital libraries have matured, the progression towards digital libraries have not been as rapid as it should have been in India. The rather slow growth of digital libraries in India could be owing to many reasons including inadequate human resources.

There have been some initiatives for training library and information professionals in digital library technologies and tools. These include short term training courses, seminars, workshops and conferences. This paper attempts to take a holistic look at the continuing education programs on digital libraries for LIS professionals. This study is based on the announcements related to continuing professional education on digital libraries made on the Indian LIS listserv called LIS Forum.

Review of literature

Many studies have been undertaken on the continuing professional education on digital libraries worldwide. Bawden et al.¹ analyzed the digital library education programs of continuing and formal education in Slovenia and in the U.K. They found that both continuing and formal education is essential and that continuing education and training helps in enhancing professional skills and competencies of the digital librarians. Spink and Cool² presented findings from a research on education for digital libraries. They reported that there were a few schools that offered courses in digital libraries. Agaja³ highlighted the necessity and opportunities for professional

continuing training and education for library professionals of Nigerian universities through refresher courses, seminars, workshops, conferences, on-the-job training or in-service trainings.

Robinson and Glosiene⁴ focused on the importance of CPD (continuing professional development) programs in library and information science. They described the activities and role of TCN (Training Centre Network) that support in CPD activities of Central Asia and Central and Eastern Europe in library and information science. Shepherd⁵ discussed the need for ongoing professional development programs for librarians in academic libraries in Rhodes University, South Africa. The article described the implementation, planning, evaluation and the design of a staff-development and training program for professional librarians. Chiware⁶ analyzed existing literature on digital library education and training and attempted to outline the training requirements for sustainable implementation of digital projects. Ma, Clegg and Brien⁷ highlighted that education on digital library is still in its early years and an adoptable model for best training in digital libraries is yet to emerge.

Lin and Wang⁸ discussed that online fora are playing a vital role in experience sharing between educator, practitioners, policy makers and the researchers. They analysed the major workshops and conferences on digital libraries that were organized in the Asian region.

Mahesh et al.⁹ focused on importance of short-term training programs on LIS in India. They highlighted that short term courses are a necessary component in the education system and these programs fulfilled the continuing education needs of the society. Mittal and Mahesh¹⁰ stated that centers with expertise on institutional repositories and digital libraries in India have evolved with continuing training programs that were developing expertise and human resource in their area.

Pujar et al.¹¹ analyzed in their study, the topics of the discussion, number of posting messages and their contributors on LIS-Forum email discussion list for the period 2006 to 2011. It was seen that LIS-Forum has been serving as a platform for the LIS professionals and students in India in creating a virtual network of its members.

Baro et al.¹² focused on the importance of short duration training program such as workshops, seminars etc. and stated that these are indispensable for the enhancement of professionals skills and competencies in the digital environment.

Massis¹³ highlighted the basic skills necessary for today's librarian to be successful in a library environment. It can be seen from the foregoing, there are a number of studies on digital libraries but a few of them focus on developing human resources for digital libraries.

Objectives of the study

- To examine postings on LIS-Forum related to development of continuing professional education on digital library in India;
- To ascertain number and types of professional development opportunities in the area of digital library; and
- To analyze major areas of professional development on digital libraries in India.

Methodology

LIS-Forum is an e-mail based discussion forum for library and information professionals in India. Discussion posts of LIS community from all over the country are available in its archive¹⁴. The LIS-Forum started operations in 1994 using the ListProc software. In 2001, it was moved to the Mailman software, which archives all the messages that are approved for circulation¹¹. The archived messages are available and accessible from April 2003 onwards in text and compressed Formats. The data for the study were gathered from the online archive of LIS-Forum (<http://ncsi.iisc.ernet.in/pipermail/lis-forum/search.html>). Messages posted to the mailing list during the twelve and half year period (April 2003 – October 2015) have been studied. Seventy three posts were shortlisted from all 19171 posts of 151 monthly issues which were related to seminar, workshops, conferences, short-term training programs or any issue related to continuing education on digital libraries or digital repositories. Repeat or duplicate posts were not accounted for. The contents of each message was studied and the observations on each post were recorded in MS Excel.

Results and discussions

Complete details about the digital library programs that include the type of program, date, year, duration, host institution and place extracted from the 73 messages are given in Annexure I.

Year-wise distribution

Table 1 shows that in the year 2008, the maximum numbers of 12 programs were communicated on the LIS-Forum. Otherwise, it ranged from a three to eight digital library continuing education and training programs for the other years.

Duration of LIS Continuing Professional Education (CPE) programs

Table 2 shows that the continuing education programs varied from 1 to 10 days. There was only one 10 days program and about 70% of the programs were of 1 to 3 days of duration. It is seen that most of programs were of two days (19), three days (19) and one day (12).

Major areas of professional development on digital libraries

Major objectives or areas of training programs that are building digital libraries, GSDL, DSpace, digital libraries and web technologies : challenges and opportunities, design and, development of digital libraries, digital library initiatives, digitization of resources, open access repositories, digitization and networking, digital preservation, advanced GSDL and RFID, digital libraries and e-learning, TQM in digital libraries, interfaces of digital library, building of institutional archives , creation and management of digital collection, digital objects and metadata: preservation, harvesting and migration etc.

Types of CPE programs on digital libraries

Table 3 gives the type of continuing professional education programs on digital library in India during the period of 2003 to 2015. Most of them were workshops (47). Although conferences (12) and seminars (8) and short-term training programs (6) were also held on digital libraries.

State-wise distribution

Table 4 represents state-wise distribution of continuing professional education program on digital libraries in India during the period of 2003 to 2015. The maximum numbers of 16 programs were held in Karnataka state. Findings of previous study showed

Table 1—Year-wise distribution

Sl. no.	Year	No. of program
1	2003	3
2	2004	4
3	2005	3
4	2006	8
5	2007	8
6	2008	12
7	2009	4
8	2010	6
9	2011	7
10	2012	3
11	2013	4
12	2014	5
13	2015	6
Total		73

Table 2—Duration of digital library CPE programs

Days	No. of programs
1 Day	12
2 Days	19
3 Days	19
4 Days	9
5 Days	9
6 Days	4
10 Days	1
Total	73

Table 3—Types of digital library CPE programs

Type of program	No. of program
Conference	12
Seminar	8
Short Term Training Program	6
Workshop	47
Total	73

that Karnataka is having highest number of ETD repositories in India.¹⁵ In Andhra Pradesh, Assam, Mizoram, Sikkim and Rajasthan, only one program in each state was held during this period.

Conclusion

Education and training is very important for the professional growth of LIS professionals in modern digital information & technological environment. Many continuing professional development programs are being organized in India such as seminars, workshops, short-term training programs, conference etc. for professional development of LIS professionals. LIS Forum is playing a vital role in

Table 4—State-wise distribution

Sl. no.	Name of State	No. of Programs
1	Karnataka	16
2	Delhi	14
3	Kerala	12
4	Tamil Nadu	9
5	West Bengal	5
6	Maharashtra	3
7	Utter Pradesh	3
8	Gujarat	2
9	Jammu & Kashmir	2
10	Telangana	2
11	Andhra Pradesh	1
12	Assam	1
13	Mizoram	1
14	Rajasthan	1
15	Sikkim	1
	Total	73

announcing these and thereby spreading the word for the benefit of LIS professionals. It is seen that only 73 digital library training programs were announced on LIS forum. Assuming that all these 73 programs were held, it can be concluded that the number of HR programs on digital libraries are very low. This conclusion is based on the slow pace of growth of digital libraries in the country as reported in other studies. It is also likely that more training programs were conducted but were not necessarily announced on LIS-Forum.

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LIS Continuing professional education (CPE) programs on digital libraries in India (During April 2003 – October 2015)

Sl. no.	Name of Program	Type	Date	Year	Duration	Host Institution	Place	State
1	Awareness program on Greenstone Digital Library Software (GSDL)	Short Term Training Program	26-Apr	2003	1 Day	NCSFNET Alumni Association, Bangalore, Karnataka	National Centre for Science Information (NCSI), Indian Institute of Science, Bangalore, Karnataka	Karnataka
2	Workshop on Developing Digital Libraries using Greenstone Digital Library Software (GSDL)	Workshop	2-6 May	2003	5 Days	NCSI - National Centre for Science Information, Indian Institute of Science, Bangalore, Karnataka	NCSI, Indian Institute of Science, Bangalore, Karnataka	Karnataka
3	Workshop on Building Digital Libraries using Greenstone Digital Library Software	Workshop	30 Nov. - 1 Dec.	2003	2 Days	Bioinformatics Centre, University of Pune, Maharashtra	Bioinformatics Centre, University of Pune, Maharashtra	Maharashtra
4	Digital Libraries Program	Short Term Training Program Seminar	19-21 Jan.	2004	3 Days	IIM Kozhikode, Kerala	IIM Kozhikode, Kerala	Kerala
5	4th ASSIST National Seminar on "Digital Resources and Services in Libraries"	Workshop	12-13 April	2004	2 Days	Kuvempu University, Shimoga, Karnataka	Kuvempu University, Shimoga, Karnataka	Karnataka
6	Seminar on Digital Libraries	Seminar	8-Mar	2004	1 Day	DRTC, Bangalore, Indian Statistical Institute & Max Mueller Bhavan (Goethe Institute), Bangalore	DRTC, ISI, 8th Mile, Mysore Road Bangalore	Karnataka
7	Workshop on developing a digital library using dspace	Workshop	28 June - 3 July	2004	6 Days	Dept of Library & Information Science, Osmania University in collaboration with INFLIBNET	Dept. of Library & Information Science, Osmania University Main Rd, Hyderabad, Telangana	Telangana
8	National Workshop on Developing Digital Library using Dspace	Workshop	9-13 May	2005	5 Days	University Library Mahatma Gandhi University Kottayam, Kerala in collaboration with INFLIBNET Centre (UGC), Ahmedabad	Mahatma Gandhi University Library, Priyadarshini, Kottayam, Kerala	Kerala
9	National workshop on Building Digital Library	Workshop	17-18 Jun	2005	2 Days	Learning resource Centre, Jaypee Institute of Information, Noida, U.P.	Jaypee institute of Information Technology (Deemed university), Noida, U.P.	Uttar Pradesh
10	Digital Libraries Program	Short Term Training Program	14-16 July	2005	3 Days	IIM Kozhikode, Kerala	IIM Kozhikode, Kerala	Kerala

Sl. no.	Name of Program	Type	Date	Year	Duration	Host Institution	Place	State
11	Workshop on Digital Libraries	Workshop	6-8 April	2006	3 Days	Myisa (Mysore Librarians and Information Scientists Association) in collaboration with SDM-IMD (SDM Institute for Management Development, Mysore. Karnataka Department of Library and Information Science, Andhra University, Visakhapatnam. Andhra Pradesh	SDM-IMD campus, Mysore. Karnataka	Karnataka
12	Workshop on Design and Development of Digital Libraries	Workshop	9-13 Oct.	2006	5 Days		Department of Library and Information Science, Andhra University, Visakhapatnam.	Andhra Pradesh
13	Isim-NIFT Training Workshop on Digital Libraries	Workshop	31 July - 5 Aug.	2006	6 Days	The International School of Information Management (isim), University of Mysore, Mysore	The International School of Information Management (isim), University of Mysore, Mysore	Karnataka
14	Workshop on Open Source Movement and the Use of Dspace Software	Workshop	28 Nov. - 1 Dec.	2006	3 Days	Indian Association of Special Libraries & Information Centres (IASLIC), Kolkata	National Institute for the Orthopaedically Handicapped (NIOH), Bonhooghly, Kolkata	West Bengal
15	Workshop on Building Digital Libraries using Dspace and GSDL	Workshop	27-28 Oct.	2006	2 Days	Society for the Advancement of Library and Information Science (SALIS Chermat Chapter) & The Central Library of B.S.Abdur Rahman Crescent Engineering College, Chennai	Thiagarajar School of Management, Madurai, Tamil Nadu	Tamil Nadu
16	Workshop on Digital Libraries	Workshop	31 October - 3 Nov.	2006	4 Days	TERI, IHC Complex, Lodhi Road, New Delhi.	TERI IHC Complex, Lodhi Road, New Delhi.	Delhi
17	ICDL 2006 - International Conference on Digital Libraries	Conference	5-8 Dec.	2006	4 Days	TERI (TIFFP, Department of Scientific and Industrial Research, Ministry of Science and Technology, Govt. of India and UNESCO and in cooperation with ACM SIGCHI)	TERI, The India Habitat Centre, New Delhi.	Delhi
18	One-Day Tutorial on Building Digital Library using GSDL and Dspace	Workshop	11 Dec.	2006	1 Day	Central Library & Computer Vision & Pattern Recognition Unit (CVPR) Indian Statistical Institute	Indian Statistical Institute, 203 B.T. Road, Kolkata	West Bengal

Sl. no.	Name of Program	Type	Date	Year	Duration	Host Institution	Place	State
19	Regional Workshop on Greenstone Digital Library Software	Workshop	8-10 Feb.	2007	3 Days	Department of Library Services Christian Medical College Vellore & Madras Library Association, Chennai	CHTC Auditorium, Christian, Medical College, Bagayam, Vellore, Tamilnadu	Tamil Nadu
20	Workshop on Digital Library Initiatives using GSDL & dspace	Workshop	16-17 March	2007	2 Days	Society for the Advancement of Library and Information Science (SALIS Chennai Chapter) & The Central Library of B.S.Abdur Rahman Crescent Engineering College, Chennai	The Central Library of B.S.Abdur Rahman Crescent Engineering College, Chennai, Tamil Nadu	Tamil Nadu
21	EMPI Digital Library National Convention 2007 (EMPIDLNC2007)	Conference	18-20 March	2007	3 Days	Engineering College, Chennai Knowledge & Learning Resource Centre EMPI Business School CSKM Educational Complex, Sabari, Chattarpur New Delhi	India International Centre, 40, Max Mueller Marg, New Delhi	Delhi
22	The Workshop on Digital Libraries	Workshop	10-13 April	2007	4 Days	TERI, IHC Complex, Lodhi Road, New Delhi and DSIR (Department of Scientific and Industrial Research), Government of India Indian Library Association (ILA) with Collaboration of BIMTECH, Greater Noida	TERI, IHC Complex, Lodhi Road, New Delhi	Delhi
23	Workshop on Digital Libraries	Workshop	1-3 Jun	2007	3 Days	with Collaboration of BIMTECH, Greater Noida	BIMTECH, Greater Noida, U.P.	Utter Pradesh
24	Workshop on "Digitization of Resources using Open Source Software: GSDL"	Workshop	23-25 Sep.	2007	3 Days	IIM-Lucknow Campus in collaboration with NAASDOC, New Delhi	IIM-Lucknow Campus	Utter Pradesh
25	National Workshop on "Open Access Repositories and Greenstone software"	Workshop	6-8 Nov.	2007	3 Days	Department of Library & Information Science, The University of Kashmir.	Department of Library & Information Science, The University of Kashmir, Srinagar, Jammu and Kashmir	Jammu & Kashmir
26	DSIR-NCST Advanced Workshop on Greenstone Digital Library Software (GSDL)	Workshop	26-28 Dec.	2007	3 Days	Department of Scientific and Industrial Research (DSIR) & NCST, IISc, Bangalore	NCST, IISc, Bangalore	Karnataka
27	Workshop on Building Digital Archive using Advanced Features of GSDL	Workshop	8-10 Jan.	2008	3 Days	TERI, New Delhi	India Habitat Centre, New Delhi	Delhi
28	National Workshop on "Building Digital Libraries Using GSDL and Dspace"	Workshop	14-15 March	2008	2 Days	Institute of Health Management Research in association with SALIS -Delhi NCR	Institute of health Management Research, Sanganeer Airport, Jaipur, Rajasthan.	Rajasthan

Sl. no.	Name of Program	Type	Date	Year	Duration	Host Institution	Place	State
29	National Workshop on "Open Access Repositories and Greenstone software"	Workshop	17-19 March	2008	3 Days	The Department of Library & Information Science, The University of Kashmir, Hazratbal Srinagar	The Department of Library & Information Science, The University of Kashmir, Srinagar, Jammu and Kashmir	Jammu & Kashmir
30	Regional Training & Workshop on Building of Institutional Archives & Digital Libraries	Workshop	24-27 Jun	2008	4 Days	Indian Statistical Institute (ISI) & Sikkim-Manipal Institute of Technology (SMIT), Majitar, Sikkim	SMIT Campus, Majitar, Sikkim	Sikkim
31	International Workshop on UNESCO's WINISIS/genesis For Digital Libraries/Archives	Workshop	6-9 Sept.	2008	4 Days	Mahatma Gandhi University Library, Idukki, Kerala	Marian College, Kutikkanam, Peermade, Idukki, Kerala	Kerala
32	Workshop on developing digital library using dspace (a program under Teqip-world bank	Workshop	27-29 Aug.	2008	3 Days	The M.S.Ramaiah Institute of Technology, Library & Information Centre, Bangalore, Karnataka	Hi-Tech Seminar Hall MSRT, Bangalore, Karnataka	Karnataka
33	Workshop on " Digital Libraries For Academic Institutions using GSDL	Workshop	4 Oct.	2008	1 Day	National Engineering College, Kovilpatti (TN) and SALLS (Tirunelveli chapter)	National Engineering College, Kovilpatti, Tamilnadu	Tamil Nadu
34	National Workshop on "Dspace for Building Institutional Repositories and Digital Libraries"	Workshop	21-25 Oct.	2008	5 Days	Mahatma Gandhi University, Kottayam, Kerala and Federal Institute of Science And Technology (FISAT), Angamaly Kerala	Mahatma Gandhi University, Kottayam, Kerala and Federal Institute of Science And Technology (FISAT), Angamaly Kerala	Kerala
35	International Workshop on Greenstone Digital Library Software	Workshop	8-13 Dec.	2008	6 Days	IIM Kozhikode, Kerala	IIM Kozhikode, Kerala	Kerala
36	Workshop on Digital Preservation in India	Workshop	7 Nov.	2008	1 Day	FICCI, Federation House, Tansen Marg, New Delhi	FICCI, Federation House, Tansen Marg, New Delhi	Delhi
37	Workshop on Digitization and Digital Library using dspace	Workshop	3-6 Dec.	2008	4 Days	Librarians Cultural Forum in collaboration with Delhi University Library System University of Delhi, Delhi	Central Library Delhi University Library System, Delhi	Delhi
38	National Conference on Digitization and Digital Preservation (NCDDP-2008)	Conference	11-12 Dec.	2008	2 Days	DESIDOC, Delhi	DESIDOC, DRDO Metcalfe House, Delhi	Delhi

Sl. no.	Name of Program	Type	Date	Year	Duration	Host Institution	Place	State
39	National Seminar on "Digitization and Networking of Library and Information Centers in NE India"	Seminar	9-10 Jan.	2009	2 Days	Department of Library and Information Science, Gauhati University, Guwahati (Assam) & Central Reference Library, Department of Culture, GOI, Kolkata	Gauhati University, Jalukbari, Guwahati	Assam
40	National workshop on Digital Libraries and Digital Archiving	Workshop	26-29 Aug.	2009	4 Days	Department of Library and Information Science, University of Kerala	Department of Library and Information Science, University of Kerala	Kerala
41	Workshop on Future Libraries: Advanced GSDL and RFID	Workshop	14-16 Jan.	2009	3 Days	TERI, New Delhi	India Habitat Centre, New Delhi	Delhi
42	NCSI-IDRC Workshop on Library Automation Packages and Digital Library Software	Workshop	27-31 July & 3-7 Aug.	2009	10 Days	National Centre for Science Information (NCSI), Indian Institute of Science (IISc), Bangalore, Karnataka	National Centre for Science Information (NCSI), Indian Institute of Science (IISc), Bangalore, Karnataka	Karnataka
43	International Conference on Digital Libraries (ICDL, 2010)	Conference	23-26 Feb.	2010	4 Days	TERI, New Delhi	TERI, New Delhi	Delhi
44	Five Days National Level Workshop on Library Automation and Building Digital Library Using KOHA and dspace Open Source Software	Workshop	18-22 Feb.	2010	5 Days	MAEER'S Maharashtra Academy of Engineering, Alandi, Pune, Maharashtra	MAEER'S Maharashtra Academy of Engineering, Alandi, Pune, Maharashtra	Maharashtra
45	SALLIS Seminar on Emerging Technologies in Digital Libraries and e-Learning	Seminar	13-Mar	2010	1 Day	K.L.N.College of Information Technology, Pottapalayam, Madurai & Society for the Advancement of Library and Information Science (SALLIS), Madurai chapter	K.L.N.College of Information Technology Pottapalayam, Sivagangai, Tamilnadu	Tamil Nadu
46	National conference on next generation digital libraries and Web technologies : challenges and opportunities (SALLIS - 2010)	Conference	20-21 Aug.	2010	2 Days	Central Library Sri Krishna College of Engineering and Technology Coimbatore & Society for the Advancement of Library and Information Science	Sri Krishna College of Engineering and Technology, Coimbatore, Tamilnadu	Tamil Nadu
47	National Seminar on "Total Quality Management in Digital Libraries"	Seminar	11 Oct.	2010	1 Day	Thiagarajar School of management(TSM), Madurai & SALLIS Madurai Chapter	Thiagarajar school of Management, Center for higher learning, Pamban swamy Nagar, Thirupparankundram, Madurai	Tamil Nadu

Sl. no.	Name of Program	Type	Date	Year	Duration	Host Institution	Place	State
48	Seminar on Different Interfaces of Digital Library: An Exploratory Study	Seminar	12 Nov.	2010	1 Day	Indian Statistical Institute Documentation Research and Training Centre, 8th Mile Mysore Road, Bangalore	DRTC, Bangalore	Karnataka
49	Seminar on Knowledge Representation and Digital Libraries (includes Workshop on advanced DSpace)	Seminar	17-18 Feb	2011	2 Days	Indian Statistical Institute Documentation Research & Training Centre, Bangalore	DRTC, Bangalore	Karnataka
50	The International Conference on Digital Library Management: ICDDL 2011	Conference	11-13 Jan.	2011	3 Days	TERI, New Delhi	Science City, Kolkata, Co-Organiser: Raja Rammohan Roy Library Foundation, Ministry of Culture, Government of India, Kolkata	West Bengal
51	National Workshop on 'Digital Objects and Metadata: Preservation, Harvesting and Migration'. IGIDR, Mumbai	Workshop	17-20 Jan.	2011	4 Days	Indira Gandhi Institute of Development Research, Film City Road, Santosh Nagar, Gen Vaidya Marg, Goregaon (East), Mumbai, Maharashtra	Indira Gandhi Institute of Development Research, Film City Road, Santosh Nagar, Gen Vaidya Marg, Goregaon (East), Mumbai, Maharashtra	Maharashtra
52	National Seminar on 'Digital Future of Library Materials: Issues and Challenges'	Seminar	17-18 March	2011	2 Days	Department of Library and Information Science, Vidyasagar University, Medinipur, West Bengal	B C Mukherjee Hall, Vidyasagar University Campus, Medinipur, West Bengal	West Bengal
53	International Workshop on Digital Libraries using Greenstone Software	Workshop	12-16 Dec.	2011	5 Days	IIM Kozhikode, Kerala	IIM Kozhikode, Kerala	Kerala
54	International Conference on Digital Libraries and Knowledge Organization (ICDK 2011)	Conference	14-16 Feb.	2011	3 Days	Management Development Institute (MDI) Indian Association of Special Libraries and Information Centres (IASLIC) INDEST-AICTE Consortium, Indian Institute of Technology (IIT), Delhi	MDI Gurgaon (National Capital Region - Delhi)	Delhi
55	Work-Shop On Managing Digital Resources In Academic Libraries	Workshop	19 Feb.	2011	1 Day	Dakshina Kannada And Kodagu Library Association (R) (Dikka) In Association with T. A. Pai Management Institute, Manipal, Karnataka	T. A. Pai Management Institute, Manipal, Karnataka	Karnataka

Sl. no.	Name of Program	Type	Date	Year	Duration	Host Institution	Place	State
56	National Workshop On Design And Development Of Digital Libraries Using Dspace	Workshop	12-13 April	2012	2 Days	Integrated Academy of Management and Technology (INMANTEC) In Association With Intellectuals Society for Socio Techno Welfare (ISST) And Ranganathan Society for Social Welfare & Library Development	Information Resource centre INMANTEC Institutions, Delhi - Hapur Bypass, NH-24	Delhi
57	National Conference on K-2012: Creating Digital Library in Globalized E-society	Conference	28-Jul	2012	1 Day	Society for information research & studies (SIRS)	Society for Information Research & Studies (SIRS), New Delhi	Delhi
58	International Workshop on Digital Libraries using Greenstone Software	Workshop	20-24 Aug	2012	5 Days	IIM Kozhikode, Kerala	IIM Kozhikode, Kerala	Kerala
59	International Conference on Digital libraries (ICDL 2013)	Conference	27-29 Nov.	2013	3 Days	TERI, New Delhi	TERI, New Delhi	Delhi
60	National workshop on design and development of digital libraries using Dspace	Workshop	22-23 March	2013	2 Days	Marian College, Kutikkannam, Kottayam District, Kerala	Marian College, Kutikkannam, Kottayam District, Kerala	Kerala
61	9th National Conference on the theme "Towards a Semantic Digital Library infrastructure	Conference	18-19 Dec.	2013	2 Days	Indira Gandhi Centre for Atomic Research, Kalpakkam, Tamil Nadu	Indira Gandhi Centre for Atomic Research, Kalpakkam, Tamil Nadu	Tamil Nadu
62	15th International Conference on Asia-Pacific Digital Libraries (ICADL 2013)	Conference	9-11 Dec.	2013	3 Days	International School of Information Management and University of Mysore	Hotel Le Meridien, Bangalore, Karnataka	Karnataka
63	National workshop on design and development of digital libraries using Dspace	Workshop	9-10 Jan.	2014	2 Days	Marian College, Kutikkannam, Kottayam District, Kerala	Marian College, Kutikkannam, Kottayam District, Kerala	Kerala
64	National Workshop on Creation and Management of Digital Collection scheduled at INFLIBNET Centre, Gandhinagar	Workshop	10-14 Feb.	2014	5 Days	The INFLIBNET Centre, Gandhinagar	The INFLIBNET Centre, Gandhinagar	Gujarat
65	AICTE Sponsored Workshop On Developing Green Stone Digital Libraries	Workshop	20-24 Jan.	2014	5 Days	T. A. Pai Management Institute, Manipal	TAPMI premises, Manipal	Karnataka

Sl. no.	Name of Program	Type	Date	Year	Duration	Host Institution	Place	State
66	One Day Workshop on "Digital Library and Journal	Workshop	11-Aug	2014	1 Days	Informatics Publishing Limited, Bangalore	University Library Conference Hall, J N T University Hyderabad, Kukatpally, Hyderabad, Telangana Bangalore, Karnataka	Telangana
67	The National Conference on "Trends in Management of Academic Libraries in Digital Environment (TMALDEN-2014)	Conference	19-20 Dec.	2014	2 Days	Jain University, Bangalore, Karnataka		Karnataka
68	UGC sponsored One-day National Workshop on DSPACE: An Open Source Software For Digital Library Initiatives	Workshop	10 Jan.	2015	1 Days	Department of Library and Information Science, Bharathidasan, University, Tiruchirappalli, Tamil Nadu		Tamil Nadu
69	Two Days Advanced National Training in Digital Library Management using DSpace.	Short Term Training Program	24-25 April	2015	2 Days	The Kerala Agricultural University collaboration with the Academic Library Association		Kerala
70	Two-Day UGC Sponsored National Workshop on "Developing Digital Library using DSpace"	Workshop	6-7 Aug.	2015	2 Days	Sri Venkataramana Swamy College, Bantwal, Mangalore, Karnataka in collaboration with Dakshina Kannada & Kodagu Library Association.		Karnataka
71	One week Short Term Course on "Digital Library and E-Resource Management	Short Term Training Program	17-22 Aug.	2015	1 Week	UGC-HumanResource Development Centre, Mizoram University	Department of Library and Information Science, Mizoram University, Aizawl	Mizoram
72	User Awareness Program on UGC INFONET Digital Library Consortium	Short Term Training Program	24-25 Aug.	2015	2 Days	Visva-Bharati Library Network & INFLIBNET	Central Library, Visva-Bharati Library Network, Santiniketan, Birbhum, West Bengal	West Bengal
73	National Workshop on Creation of IR using Open Source Software	Workshop	26-28 Aug.	2015	3 Days	INFLIBNET Centre, Infocity, Gandhinagar, Gujarat		Gujarat

Role of NISCAIR in Professional Development on Digital Libraries

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Abstract

Due to the ever-increasing nature of digital information, library and information science (LIS) professionals discover new ways to deal with the digital information resources in libraries. This requires in-depth know-how and expertise in digital library (DL) tools and technologies. In this context, this article explores the role of CSIR-NISCAIR (Council of Scientific and Industrial Research-National Institute of Science Communication and Information Resources) in education and training for library and information management with special reference to professional development activities on digital libraries.

Keywords: Digital libraries, CSIR-NISCAIR, INSDOC, Human Resource Development, Education and training, Short-term training courses, Professional development in digital libraries

Introduction

Today's information arena is replete with opportunities to find, organize, transmit, share, and publish information in the preferred manner as desired by the user. The digital resources in libraries are even replacing the printed volumes which pose a managerial challenge for libraries and (library) professionals.

The concept of digital libraries has become a reality in present times. Library and information professionals are supposed to manage digital content which is available in different forms and formats. However, digital libraries have been unsustainable due to many reasons, including lack of education and training avenues for the new and working professionals.¹

The need to improve competencies and digital library skills is being emphasized in library and information science (LIS) literature. In present times, no doubt, there have been some initiatives for training library and information professionals on digital library technologies and tools; these include short-term training courses, seminars, workshops, and conferences. Such initiatives have been undertaken by institutions, such as The Energy and Resources Institute, New Delhi; Information and Library Network Centre (INFLIBNET), Gandhinagar; IIM Kozhikode; Documentation Research and Training Centre (DRTC), Bangalore; NCSI-IISc, Bangalore; Defence Scientific Information and Documentation Centre-DRDO (DESIDOC), New Delhi, CSIR-NISCAIR, New Delhi, for organizing various types of continuing professional education programmes to improve competencies and digital library skills of LIS professionals.²

The CSIR-National Institute of Science Communication and Information Resources (CSIR-NISCAIR) is one of the leading institutes, contributing towards bringing newer skills to manage libraries in general and developing digital libraries, in particular. At present, CSIR-NISCAIR is primarily providing training in

various areas of information and communication technology (ICT) applications in libraries using open source softwares. It is pertinent to note at this juncture that digital libraries forms one of the focus areas of CSIR-NISCAIR training. This article explores the role of CSIR-NISCAIR with regard to professional development activities in digital libraries.

Objectives

- To explore professional development activities of NISCAIR in general and digital libraries in particular.
- To analyse the efforts made by NISCAIR for development of LIS professionals in digital libraries.

Methodology

Data has been collected from primary sources, such as annual reports, training course calendars, training brochures, prospectus of the training courses³ of the Education and Training Division (ETD), CSIR-NISCAIR, New Delhi. The data have been analysed and presented through different tables and figures.

Limitations

The study is, however, limited to exploring short-term training courses on digital libraries, conducted by CSIR-NISCAIR during the session 2010–11 to 2015–16. It was intended to make a study of all the programmes conducted on digital libraries (DLs) by NISCAIR. However, due to non-availability of data, the time is restricted to the above-mentioned period.

CSIR-NISCAIR: A Short History

During the Second World-War, the government of India began to take interest in development of scientific research in the country and consequently, setup a bureau for scientific and industrial activities, the fore-runner of the Council of Scientific and Industrial Research (CSIR) in 1942. After the country attained

independence in 1947, scientific research received further impetus in the growth in a number of science-based—societies, literature, and journals, etc. The Government of India evinced keen interest in developing documentation and information services as a necessary infrastructure support for research and development (R&D) activities. The most significant development in the Indian scene of documentation in the early fifties was establishment of the Indian National Scientific Documentation (INSDOC) at New Delhi in 1952 by the Government of India in cooperation with UNESCO in order to provide the complete range of documentation services to the existing and projected national laboratories, scientific and technological institutions, universities, industries, and so on.⁴

The National Institute of Science Communication and Information Resources (NISCAIR) came into existence on September 30, 2002, with the merger of the National Institute of Science Communication (NISCOM) and Indian National Scientific Documentation Centre (INSDOC). Both NISCOM and INSDOC, the two premier institutes of the Council of Scientific and Industrial Research (CSIR), were devoted to dissemination and documentation of science and technology (S&T) information.⁵

Professional Development Activities of NISCAIR: A Review

The CSIR-National Institute of Science Communication and Information Resources has been playing a vital role in education and training for library and information management since the past six decades. CSIR-NISCAIR has been conducting human resource development programmes to educate and prepare LIS professionals, science communicators, and R&D personnel to meet the challenges of current times. Currently, NISCAIR is providing two types of HRD programmes—(i) short-term training courses and (ii) on-site training courses. These short-term training programmes are for in-service library professionals and persons

interested in the field of LIS. The duration of the major programmes ranges from one to two weeks.⁶

With the increasing demand of qualified and trained professionals to manage the growing explosion of information, library and documentation centers and the training of LIS professionals assumes importance. INSDOC (now NISCAIR) initiated the AIS course in 1964 for provision of a more meaningful and efficient documentation and information service in the new context.⁷

Rajan (1983)⁸ examined curriculum development of the INSDOC training course of Associateship in Information Science during 1980s. He mentioned about the emerging information institutions in India and efforts to developing the required manpower to organize and manage information services in the changing context.

Anand and Sen (1991)⁹ also studied INSDOC's training courses during the years 1987 and 1990 wherein INSDOC organized eight short-term training courses of four weeks duration each, training 120 candidates during the period. The course content was also analysed. Participants included working librarians, information specialists, and teachers of LIS schools.

Mahesh *et al.* (2010)¹⁰ focused on importance of short-term training programmes on LIS in India and mentioned NISCAIR as one of the national-level institutes in the country, with the mandate and expertise for conducting training courses and wherein short-term training in LIS was concentrated. As its mandate that to carry out training activities, NISCAIR started conducting training on many open source software, such as DSpace, GSDL, NewGenLib, and so on. They highlighted that short term courses are a necessary component in the education system and these programmes fulfilled the continuing education needs of the society.

Mahesh and Gupta (2010)¹¹ presented an overview of all the libraries of Council of Scientific and Industrial Research (CSIR) and

focussed on human resource development programmes with various activities of INSDOC and mentioned that INSDOC, which is housed in the National Science Library, conducts training programmes that lead to an Associateship in Information Science.

Harake and Hadagali (2016)¹³ highlighted the importance of continuing education programmes for the library and information science professionals. They mentioned that NISCAIR, INFLIBNET, IASLIC, ICSSR are conducting short-term and long-term training programmes on various aspects in the field of library and information science. These were identified as the most interesting areas of training on IT and its related aspects like, LIS software, applications of IT, Internet and its applications, web based services, database management, and so on.

Digital Libraries Development at NISCAIR

The university–industry interaction has always been emphasized for quality outputs of the higher education system. CSIR-NISCAIR undertook many projects for development of DLs in order to establish its credibility in the development of professionals in DLs.

The important DL-related projects/activities are as follows:

- **NOPR (NISCAIR Online Periodicals Repository):** NOPR is an online periodicals repository of NISCAIR (<http://nopr.niscair.res.in>), launched on October 14, 2008, in open access mode. It is an open access institutional repository, developed, and maintained by CSIR-NISCAIR for wider dissemination of its scholarly literature. Anyone can access full text articles from research journals published by CSIR-NISCAIR. Full text facility is provided for all eighteen research journals, that is, *Annals of Library and Information Studies* (ALIS), *Bharatiya Vaigyanik evam Audyogik Anusandhan Patrika* (BVAAP), *Indian Journal of Biochemistry and Biophysics* (IJBB), *Indian Journal of Biotechnology* (IJBT), *Indian Journal of Chemistry, Sec A* (IJCA), *Indian Journal of Chemistry, Sec B* (IJCB), *Indian Journal of Chemical Technology* (IJCT), *Indian Journal of Experimental Biology* (IJEB), *Indian Journal of Engineering & Materials Sciences* (IJEMS), *Indian Journal of Fibre & Textile Research* (IJFTR), *Indian Journal of Geo-Marine Sciences* (IJMS), *Indian Journal of Natural Products and Resources* (IJNPR), *Indian Journal of Pure and Applied Physics* (IJPAP), *Indian Journal of Radio and Space Physics* (IJRSP), *Indian Journal of Traditional Knowledge* (IJTK), *Journal of Intellectual Property Rights* (JIPR), *Journal of Scientific and Industrial Research* (JSIR) & *Journal of Scientific Temper* (JST). NOPR also hosts three popular science magazines, namely *Science Reporter* (SR), *Vigyan Pragati* (VP), and *Science Ki Duniya* (SKD), and a *Natural Products and Resources Repository* (NPARR). The repository currently holds about 39,000+ full text articles made available in open access mode till December 2017. This repository is designed and developed by DSpace digital repository software^{13, 14}.
- **NSDL (National Science Digital Library):** National Science Digital Library (NSDL) was developed by NISCAIR under the Tenth Five Year Plan network project of Council of Scientific and Industrial Research (CSIR) to provide comprehensive S&T information to students of science, engineering, and technology in the country. NSDL provides curriculum-based content to address the information needs of the undergraduate students of science. The repository currently holds total 584 full text items made available in open access mode till December 2017. This repository is also based on DSpace digital repository software.¹⁵
- **NSL Digitization Facility:** The National Science Library (NSL) is an important part

of NISCAIR. The NSL Digitization Facility was established in September 2014 with the objective to digitize all the back volumes of the research journals published by NISCAIR. The digitized journals are uploaded on the NISCAIR Online Publications Repository (NOPR) platform.¹⁶

- **Sir Shanti Swaroop Bhatnagar Repository:** The National Science Library created a repository on the works by and on Sir Shanti Swaroop Bhatnagar. This repository is based on Greenstone Digital Library Software (GSDL). It can be accessed at <<http://nsl.niscair.res.in:443/ssbr.html>>. The repository currently holds 110 full text research papers, lectures, rare documents, speech, and so on, of Sir Shanti Swaroop Bhatnagar.¹⁶
- **Library Modernization Facility:** Recently, since 2016, CSIR-NISCAIR initiated the library modernization facility comprising of the data migration facility between different library management softwares; setting up of institutional repository/digital library (installation and configuration) using DSpace software and technical support/training of open source software for libraries. This facility is providing by NISCAIR as per demand with prescribed charges.¹⁷

NISCAIR and its professional development activities

The first time in-service training course in 1901–06 in India was initiated by John Macfarlane, the first librarian of National Library of India (earlier Imperial Library). The training programme was, however, only meant for other library staff and interested LIS professionals. Thereafter, in 1911, Siyajji Rao Gaikwad initiated the first training school in library education in India.¹⁸

The enormous changes that were to come in the library and information field alter its complexion were in evidence to some extent right in early sixties. The realization that new skills and technologies were needed to handle

and disseminate information dawned upon those involved. At the same time, many of the established library schools in the country were found to be slow in introducing new programmes to suit the changing requirements. The decision was taken in the conference of information scientists convened by CSIR at Mysore in 1963 towards the need for training on documentation and information management and recommended that INSDOC be entrusted with the responsibility of conducting a regular training course for information professionals. Thereafter, INSDOC began a full-time training course leading to award of Associateship in Information Science in 1964. The objectives of this course were to train personnel and equip them with necessary skill and technical know-how to plan, organize, manage, control, supervise, and evaluate documentation and information services in R&D, industrial, and other cognate establishments.¹⁰

Equipped with the necessary facilities and manpower, NISCAIR is ideally placed to train and prepare science communicators, R&D personnel, and library and information professionals to meet the challenges of current times.¹⁹

Education and training programmes of NISCAIR include:

- Associateship in Information Science (AIS)
- Short-term training courses
- Attachment training courses
- On-site training courses (at other institutions/organizations)

The AIS course of NISCAIR initiated in 1964, however, was discontinued in 2012 due to some policy issues and internal matters. Thereafter, NISCAIR has been conducting short-term training courses of one week/two weeks/one month regularly on different aspects of LIS. Table 1 mentions broad areas of the programmes conducted in recent years.

It has been envisaged that the training for library automation, ICT applications, science

Table 1: Areas of short-term training conducted by CSIR-NISCAIR, New Delhi

S.N.	Name of Short-term training course	S.N.	Name of Short-term training course
1.	Computer Applications in Library and Information Activities	20.	Bar code and RFID Technologies for libraries
2.	Information Technology for Information Management	21.	Library automation using Koha – Basic and Advance
3.	Library Automation and Resource Sharing	22.	Advanced WINISIS
4.	Scientific Paper Writing	23.	Library Automation using NewGenLib
5.	Attachment Training Programme for SDC-sponsored candidates	24.	Office Automation
6.	Training course on WINISIS	25.	Bibliometric tools and techniques for measurement and evaluation of research output
7.	SDC Attachment course on "Information Technology for Information Management	26.	Innovations & Patent Management
8.	Patent Drafting	27.	ABCD - A complete solution for libraries
9.	Technical Communication	28.	DSpace Software for Design and Development of Institutional Repositories
10.	Herbarium Techniques	29.	Data Analytics
11.	e-Resource Management	30.	Information Communication Technology for Information Management
12.	Recent Trends in Library and Information Science	31.	Open Journal Systems (OJS) Software for Journal Publishing
13.	Design and Development of Digital Libraries using GSDL – Basic and Advance	32.	Science Writing
14.	Design and Development of Digital Libraries using DSpace–Basic and Advance	33.	Science Publishing
15.	Access and management of e-Resources	34.	Website Development
16.	Science communication through print media	35.	Social Media Communication
17.	ICT applications to L&I activities	36.	Formulating Science Project Proposals
18.	Web 2.0 technologies for Libraries	37.	SHARED Communication
19.	Library Automation and Networking		

communication, and digital libraries have been the main focus of the programmes. More importantly, exposure to the newer applicable softwares, mainly OSS, has been included in the training offered by CSIR-NISCAIR during 2002–16.

Discussion

Since 2002, NISCAIR conducted 186 training courses and trained 2,425 LIS professionals. Every year, the ETD selects the training areas and

courses to be offered. Table 2 provides details of the training courses and participants year-wise and also offers details of courses related to DLs.

Table 2 also shows how short-term training on digital libraries (DSpace & GSDL) began in 2008. From 2008 to 2016, NISCAIR conducted 31 training courses on DLs and trained 429 professionals for the same. This is inclusive of 5 courses conducted onsite for students of *Certificate Programme on Digital Libraries* (CPDL) of VMOU, Kota.

Detailed information about short-term training courses on digital library softwares (GSDL & DSpace) conducted by NISCAIR from 2008 to 2016 at its premises at New Delhi have been reproduced in Annexure I. It shows that 315 participants have been trained in 25 short-term training courses on digital library.

Short-term training programmes at NISCAIR Campus

Table 3 presents information about the programmes conducted and participants from 2010 to 2016.

The table also shows that NISCAIR has prepared 242 human resources through 18 short-term training courses on digital libraries (GSDL & DSpace) during the period of the study from

the session 2010–11 to 2015–16. The maximum number of courses (5) was conducted during 2015–16 but maximum number of participants (65) was trained during 2011–12.

Figure 1 shows the gender-wise distribution of the participants, trained in short-term training courses on digital libraries (GSDL & DSpace) from the session 2010–11 to 2015–16 conducted by NISCAIR. As is visible, the majority was male participants (165; 68 per cent) and female participants comprised only 32 per cent (77).

Figure 2 shows the category of the participants who self-financed or were sponsored by her/his institution/organization/university.

The figure indicates that maximum participants (66.94 per cent; 162) were self

Table 2: Year-wise short-term & attachment training courses from 2002 to 2016

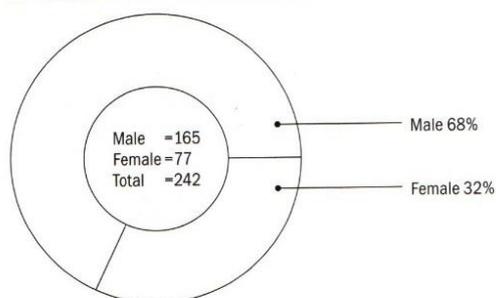
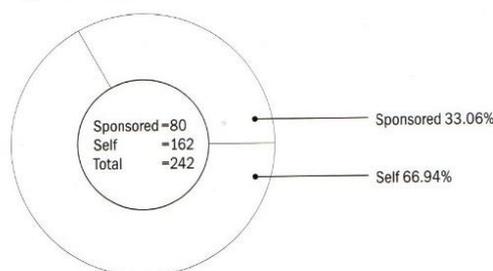
A Year	B No. of Short-term & attachment training Courses	C Total No. of Participants	D Training courses based on digital libraries (DSpace /GSDL)\$	
			No. of Courses	No. of Participants
2002-03	15	120	-	-
2003-04	7	99	-	-
2004-05	9	112	-	-
2005-06	8	112	-	-
2006-07	8	64	-	-
2007-08	13	242	-	-
2008-09	23	278	3	31
2009-10	21	247	5	86
2010-11	19	250	2	39
2011-12	12	210	4	65
2012-13	5	56	-	-
2013-14	14	184	4	48
2014-15	12 + 4* = 16	184 + 73* = 257	3 + 3* = 6	40 + 51* = 91
2015-16	14 + 2* = 16	175 + 19* = 184	5 + 2* = 7	50 + 19* = 69
Total	186	2,425	31	429

*Onsite training courses provided by NISCAIR

\$ Values included in respectively columns B & C

Table 3: A glance of digital library training courses during 2011 to 2016

Year	No. of Courses	No. of Participants
2010-11	2	39
2011-12	4	65
2012-13	-	-
2013-14	4	48
2014-15	3	40
2015-2016	5	50
Total	18	242

**Figure 1:** Gender-wise Distribution of Participants**Figure 2:** Comparison between self-financed and sponsored participants

financed and 33.05 per cent (80) participants were sponsored by her/ his institution/ organization/university.

The participation in the programme remained from all over the country. Figure 3 indicates the number of participants from respective states in the country.

Figure 3 also shows the geographical distribution of the training participants through short-term training courses on digital libraries

(GSDL & DSpace) during the session 2010-11 to 2015-16. It shows that 239 participants (out of 242) hailed from different states of the country and three participants were from abroad, two participants from Sri Lanka, and one was from Uganda. Participants from Uttar Pradesh (54), Delhi (45), and Maharashtra (24) remained highest during the period of the study.

On-site training programmes

It has been discussed that NISCAIR is conducting on-site training courses as well as per demand from other institutions/organizations. NISCAIR has conducted five times one-week on-site short-term training courses on 'Design and Development of Digital Libraries using GSDL and DSpace' at the Vardhman Mahaveer Open University (VMOU), Kota (Regional Center, Jaipur, and Kota) during the years 2014 to 2016. VMOU is a state open university, established by an Act of the Rajasthan Legislative Assembly in 1987 and is inclusive of DLIS, BLIS, MLIS, M.Phil (discontinued in 2011), and doctoral programmes. The Certificate Programme on Digital Libraries (CPDL) was initiated in 2014 as a six month programme and NISCAIR offers practical training to the students of CPDL at Regional Center Jaipur, and Kota. The six-day training includes an introduction to both GSDL and DSpace softwares which are useful for DLs. Table 5 provides details of the numbers of students attending the training programme of NISCAIR as part of CPDL programme of VMOU.

Table 5 indicates that in all, 70 participants attended training at VMOU during three years. This arrangement has been a constant feature and induction of DL concept at the student level, may be beneficial in establishing DLs in their career at a later stage.

Course Contents of Short-term Courses on digital libraries

As discussed earlier, NISCAIR has been continually conducting short-term training programmes on DLs, majorly comprising two DL

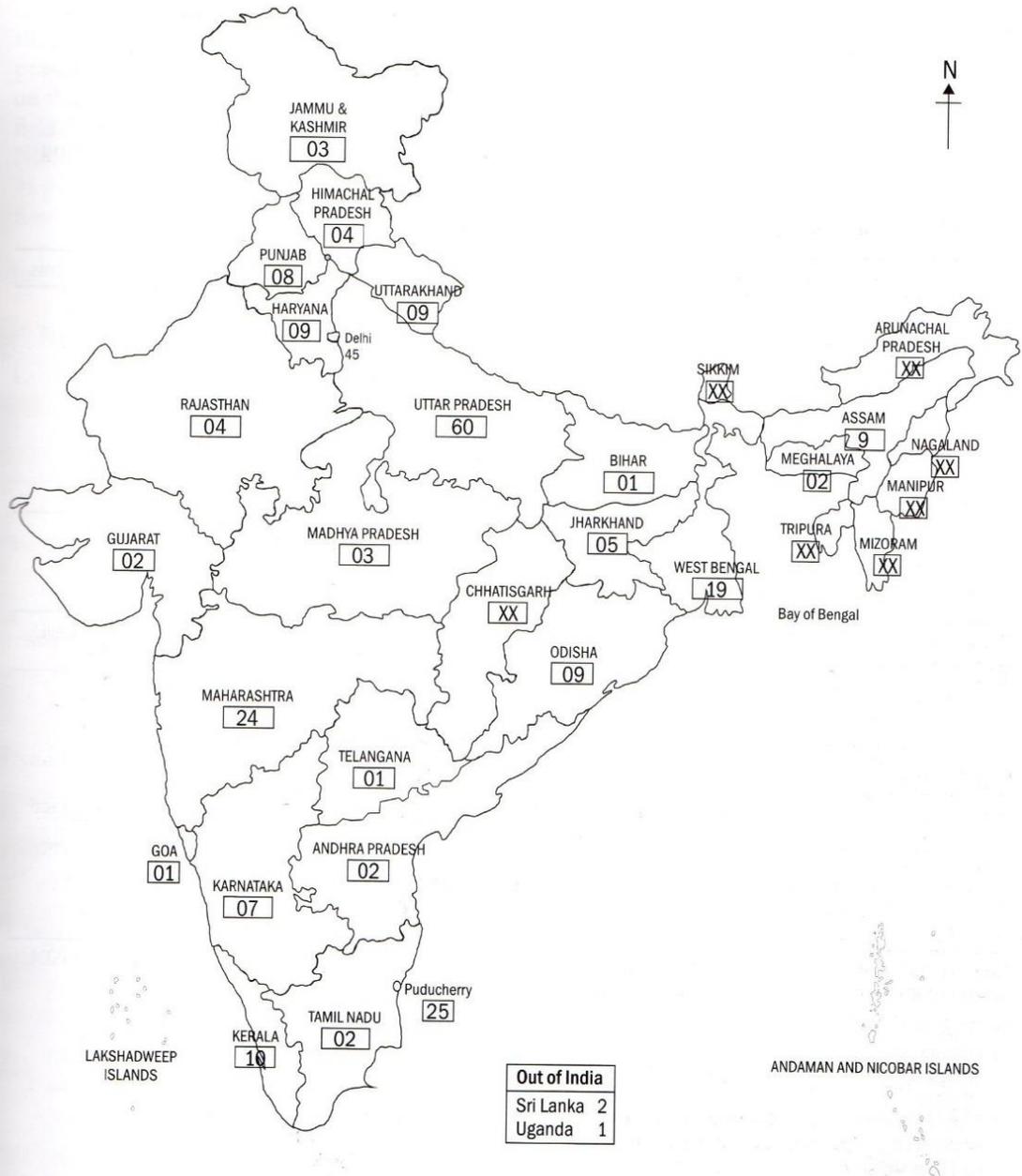


Figure 3: Geographical distribution of trained participants

softwares—Greenstone Digital Library Software (GSDL) and DSpace.

Table 6 enumerates the broad course contents of basic and advanced programmes on “*Design and Development of Digital Libraries using GSDL and DSpace*”.

Conclusion

Education and training has been extremely significant for the continuing professional development of LIS experts. CSIR-NISCAIR has been conducting many short-term training

Table 5: On-site training courses provided by NISCAIR on Digital Library (GSDL & DSpace)

Year	Organization/Venue #	Course Name	Course Date	No. of Participants
2014-15	VMOU, Kota	Design and	July 7-14, 2014	18
	VMOU, RC, Jaipur	Development of	July 21-26, 2014	20
	VMOU, RC, Jaipur	Digital Libraries using GSDL and	Dec 29, 2014-Jan 03, 2015	13
2015-16	VMOU, RC, Jaipur	DSpace	July 13-17, 2015	08
	VMOU, RC, Jaipur		Dec 28, 2015-Jan 02, 2016	11
Total:		5 times training course		70

VMOU – Vardhman Mahaveer Open University, Kota (RC – Regional Center)

Table 6: Broad Course Content of Short-term Courses on Digital Libraries

Design and Development of Digital Libraries using DSpace – Basic	Design and Development of Digital Libraries using GSDL – Basic
<ul style="list-style-type: none"> • Digital Library: Concepts and Software • Metadata: Overview • Linux: An Open Source • Operating System • DSpace Overview • DSpace Installation • Administration: Communities, Collections, Items, Groups, ePeople • Customization, Authorisation • Backup & Restore • Metadata Harvesting 	<ul style="list-style-type: none"> • Digital Library: Concepts and Software; Metadata: Overview • GSDL software: Overview, Features, Capabilities, Applications • Installation, Configuration; Accessing Example • Collection Building with Greenstone Librarian Interface (GLI) • Adding and Using Metadata; Customizing the Collection • Creating a Collection on CD / DVD, etc.
Design and Development of Digital Libraries using DSpace – Advance	Design and Development of Digital Libraries using GSDL – Advance
<ul style="list-style-type: none"> • DSpace Installation • DSpace Customization: Look and Feel; Language; Metadata Input, etc. • DSpace Configuration • User Management and Authentication • Migration / Up-gradation from Old Version to New Version • Backup & Restore • Import and Export • Statistical Reports • Metadata Harvesting 	<ul style="list-style-type: none"> • Installation, Configuration; Accessing Example • Handling of Metadata in GSDL • Advanced HTML Document Handling • Enhanced PDF Document Handling • Enhanced Word Document Handling • Section Tagging for HTML Documents • Scanned Image Collection • Multimedia Documents Handling • Development of Audio/Video Collection • Administration, Customization & Interoperability • Incremental Building with Depositor • Realistic Books Display in GSDL • Bibliographic Collections: MARC & CDS/ISIS • Remote Login and Uploading File

courses for LIS professionals in India since the past six decades. NISCAIR has also been providing certain short-term training courses on the open source software, popular in the field of library automation and digital libraries. NISCAIR has trained 429 professionals through 31 short-term training courses on digital libraries from 2008 to 2016.

CSIR-NISCAIR's continual efforts will help in the involvement of greater number of

professionals in the creation of digital libraries/repositories across India.

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Annexure I

Training Courses on Digital Library Softwares (GSDL & DSpace) conducted by NISCAIR

Year	Course Name	Course Date	No. of Participants
2008-2009	Design and development of digital libraries using DSpace	12 - 16 May 2008	11
	Document management using DSpace	20-25 October 2008	06
	Design and development of digital libraries using GSDL	15-19 December 2008	14
2009-2010	Design and Development of Digital Libraries using GSDL	20-24 April 2009	18
	Design and Development of Digital Libraries using DSpace	13-17 July 2009	25
	Design and Development of Digital Libraries using DSpace	17-21 August 2009	14
	Design and Development of Digital Libraries using GSDL	4-6 January 2010	07
	Design and Development of Digital Libraries using DSpace	18-22 January 2010	08
2010-2011	Design and development of digital libraries using GSDL	17-21 January 2011	14
	Design and development of digital libraries using Dspace	21-25 February 2011	25
2011-2012	Design and development of digital libraries using Dspace	06-10 June 2011	21
	Design and development of digital libraries using GSDL	11-15 July 2011	14
	Design and development of digital libraries using GSDL	16-20 January 2012	14
	Design and development of digital libraries using Dspace	20-24 February 2012	16
2012-2013	-	-	-
2013-2014	Design and development of digital libraries using Dspace	02-06 September 2013	22
	Design and development of digital libraries using GSDL	29 July - 02 August 2013	9
	Design and development of digital libraries using GSDL	06-10 January 2014	4
	Design and development of digital libraries using DSpace	03-07 February 2014	13

2014-2015	Design and Development of Digital Libraries using GSDL - Basic	02 - 06 June 2014	4
	Design and Development of Digital Libraries using DSpace - Basic	14 - 18 July 2014	24
	Design and Development of Digital Libraries using DSpace - Advance	Feb 02 - 06, 2015	12
2015-2016	Design and Development of Digital Libraries using DSpace - Basic	Oct 26 - 30, 2015	14
	Design and Development of Digital Libraries using GSDL - Basic	Nov 16 - 20, 2015	6
	Design and Development of Digital Libraries using DSpace - Advance	Feb 08 - 12, 2016	21
	Design and Development of Digital Libraries using DSpace - Advance	Feb 29 - March 04, 2016	9
Total	25 training courses		315

*GSDL - Greenstone Digital Library Software

Conference Paper Presentations

(National and International)

S. No.	Title of Paper	Conference	Organiser /Place	Presenter and Participation	Date and Year
1.	Online Courses on Digital Libraries: An Exploratory Study	International Conference on Digital Libraries (ICDL) 2016	TERI, New Delhi	Vijendra Kumar	13-16, December 2016
2.	Challenges of Competency Development on Digital Libraries in India	3rd National Conference on Management of Modern Libraries (NACML) – 2018	Manipal Academy of Higher Education, Karnataka	Vijendra Kumar	9-10, February 2018



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