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SNDT Women's University, Mumbai



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**Digital Library Resources & Services in Deemed
University Libraries in Maharashtra:
Access, Usage, and Academic Impact**
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Dr. Sima Ingole & Dr. Subhash Chavan

2026

**Digital Library Resources and Services in
Deemed University Libraries in Maharashtra:
Access, Usage, and Academic Impact**

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About SNTD Women's University

SNTD Women's University is the first women's university in India and South-East Asia, founded in 1916 by Maharshi Dr. Dhondo Keshav Karve with the vision of empowering women through education. The University is headquartered at Churchgate, Mumbai, with additional campuses at Juhu (Mumbai) and Karve Road (Pune). It has a vast academic structure comprising 37 university departments, 13 constituent institutions, and 174 affiliated colleges across Maharashtra, Gujarat, Goa, Madhya Pradesh, and Uttar Pradesh, collectively serving over 70,000 students.

The University has consistently maintained strong academic standards and was awarded NAAC A+ Accreditation in 2025. In alignment with the National Education Policy (NEP) 2020, it established the Centre for Holistic Education, Training and Novel Advancements (CHETNA) in 2022 to promote multidisciplinary and innovative learning. It has also strengthened its academic and research ecosystem through approximately ₹100 crore funding under the PM-USHA Scheme (2024) and is developing the Maharshi Karve Women Empowerment Knowledge Campus at Ballarpur, Chandrapur, with a major government investment to expand skill-based and employment-oriented education for women.

Beyond academics, SNTDWU actively promotes innovation, culture, and student development through initiatives such as Abhivyakti Manch, Yuva Mahotsav, and Innovative Mahakumbh, which supports entrepreneurship and has nurtured incubated, funded, and pre-incubation startups involving students and faculty. The University also preserves Indian Knowledge Systems through BHAGYASY (Bhartiya Gyan, Sanskrit evam Yog Kendra) and the Jagarani Project, which highlights the contributions of Indian women scholars under the theme "Nari Se Narayani." It further strengthens global academic engagement through collaborations such as the International Conference on Climate Change (ICCC-2025) with CUNY, USA. Student welfare remains central through initiatives like Earn and Learn, anti-ragging measures, grievance redressal systems, health camps, and leadership programmes. The 75th Annual Convocation (2025) reflected the University's legacy and its forward-looking vision of innovation, sustainability, and ethical leadership for national development.

Message by Hon'ble Vice-Chancellor

It gives me immense pleasure to present this monograph authored by **Dr. Sima Ingole**, developed from her doctoral research in the field of Library and Information Science at SNDT Women's University.

The monograph, titled “**Digital Library Resources and Services in Deemed University Libraries in Maharashtra: Access, Usage, and Academic Impact**” is based on the scholar's Ph.D. thesis completed under the able guidance of **Dr. Subhash Chavan**. This work represents a significant contribution to the field of Library and Information Science, examining the utilization, accessibility, and effectiveness of digital resources and services offered by the central libraries of deemed universities in Maharashtra. Through a systematic evaluation of digital library practices, the study provides valuable insights into user engagement, information access, technological integration, and the evolving role of academic libraries in supporting teaching, learning, and research.

The publication of this monograph reflects the University's commitment to making high-quality doctoral research accessible to a wider academic and professional community. Research of this nature contributes to the advancement of knowledge in information management and library services, while offering evidence-based recommendations that can inform policy decisions, resource planning, and the enhancement of digital library infrastructures in higher education institutions.

I congratulate Dr. Sima Ingole on this noteworthy achievement. Her dedication, scholarly rigor, and commitment to advancing knowledge in the field have culminated in a publication that will serve as a valuable resource for researchers, academicians, library professionals, information scientists, students, and educational administrators. I also extend my sincere appreciation to Dr. Subhash Chavan for his guidance and mentorship throughout the research journey.

I am confident that this monograph will stimulate further scholarly discussion and contribute meaningfully to understanding the opportunities and challenges associated with digital resource management and service delivery in academic libraries. May it inspire future researchers and practitioners to explore innovative approaches for enhancing information access and supporting knowledge creation in the digital age.

On this auspicious occasion of the University Foundation Day (5 July 2026), I extend my best wishes to Dr. Sima Ingole and look forward to many more such scholarly contributions that showcase the richness and diversity of research emerging from SNDT Women's University.

Warm regards,

*Prof. Dr. Ujwala Chakradeo,
Vice-Chancellor, SNDT Women's University*

PREFACE

The transformation of academic libraries in the twenty-first century has been profoundly shaped by rapid developments in Information and Communication Technology (ICT). Libraries are no longer confined to physical collections; instead, they have evolved into digitally enabled knowledge centres that provide seamless access to information across geographical and temporal boundaries. This book, titled “Digital Library Resources & Services in Deemed University Libraries in Maharashtra: *Access, Usage, And Academic Impact*”, examines this transformation within the specific context of deemed university libraries in Maharashtra.

Digital resources—including e-journals, e-books, online databases, Web OPACs, and institutional repositories—have significantly strengthened teaching, learning, and research practices in higher education. These resources offer speed, accessibility, remote availability, and advanced search capabilities, thereby enhancing academic productivity. The COVID-19 pandemic further underscored the necessity of digital library services, as institutions were compelled to shift toward online teaching and remote access to scholarly content. In this environment, digital libraries became central to ensuring academic continuity and uninterrupted research support.

To establish conceptual clarity, key terms such as Digital Resources, Digital Services, Digital Library, Deemed University, Users, and Evaluative Study are defined using authoritative sources, including the International Federation of Library Associations and Institutions (IFLA), the Digital Libraries Federation, and the National Assessment and Accreditation Council (NAAC). These definitions provide a theoretical foundation for understanding the scope and structure of digital library services in higher education.

The study focuses on twenty-one Deemed Universities in Maharashtra, among them the Tata Institute of Social Sciences, Symbiosis International University, and Narsee Monjee Institute of Management Studies. Employing a survey research design, structured questionnaires were administered to librarians and users, including postgraduate students and research scholars. Of the 1,050 distributed questionnaires, 850 valid responses were received, yielding an 81 percent response rate. This substantial participation strengthens the reliability of the study’s findings.

The primary objectives of this research are to examine the availability and types of digital resources, assess user awareness and patterns of use, evaluate satisfaction levels, analyse ICT infrastructure, and identify the challenges users face in accessing digital services. The study also formulates hypotheses regarding the adequacy of digital collections, infrastructural support, and users' perceptions of the effectiveness of digital resources.

The findings reveal that digital resources have a significant positive impact on academic development, research productivity, and information accessibility. However, persistent challenges such as slow internet connectivity, limited user training, and insufficient awareness programs hinder optimal utilization. The chapter concludes by emphasizing the need for continuous updating of digital collections, improved ICT infrastructure, and structured user-orientation programs to ensure the effective and meaningful use of digital resources in deemed university libraries.

This introductory chapter thus lays the conceptual and methodological foundation for the detailed analysis presented in the subsequent chapters of the book.

Keywords: Digital Resources and Services; User Awareness; Usage Frequency; User Satisfaction; Barriers; Academic Impact; Digital Libraries; Evaluative Study; Deemed Universities; Maharashtra.

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LIST OF ABBREVIATIONS/ACRONYMS USED

Abbreviated Term(s)/Acronyms	Full form of the Terms/Acronyms
AACR-2	Anglo American Cataloguing Rules -2
CD ROM	Compact Disc Read Only Memory
CeRA	Consortium For E-Resources In Agriculture
DAM	Digital Asset Management
DELNET	Developing Library Network
E-Book	Electronic Book
EBSCO	Elton B Stephens Company
E-Circulation	Electronic Circulation
E-Dissertations	Electronic Dissertations
E-Journal	Electronic Journal
E-Newsletter	Electronic Newsletter
E-Standards	Electronic Standards
ETD	Electronic Theses/Dissertations
E-Theses	Electronic Theses
e-zines	Electronic Magazines
ICT	Institute of Chemical Technology
ICT	Information and Communication Technology
IFLA / FAIFE	Advisory Committee on Freedom of Access to Information and Freedom of Expression
ILA	Indian Library Association
ILL	Inter Library Loan
ILS	Integrated Library Systems
INDEST	Indian National Digital Library in Engineering Science & Technology
MHRD	Ministry of Human Resource Development
NAAC	National Assessment And Accreditation Committee
NDLI	National Digital Library in India
OER	Open Educational Resources
OPAC	Online Public Access Catalogue

PC	Personal Computer
PG	Post-Graduation
RLG	Research Libraries Group
SPSS	Statistical Package for Social Sciences
SSOAR	<i>Social Science Open Access Repository</i>
UGC	University Grants Commission
UGC - INFONET	University Grants Commission – Information Network

CHAPTER 1

INTRODUCTION

Digital Resources in Higher Education: Context, Concepts, and Significance

1.1 Introduction

Rapid advances in information and communication technologies (ICT) have changed higher education globally. Libraries, once seen only as repositories of printed knowledge, have now become vibrant digital hubs that facilitate research, education, and learning. The rise of digital resources—such as online databases, electronic books, electronic journals, institutional repositories, and digital library services—has fundamentally changed how information is produced, accessed, shared, and utilized.

Digital resources play a crucial role in scholarly communication and academic productivity by enabling instant access to information, facilitating efficient research workflows, and making collaboration simpler. With these advantages, university libraries — especially those at research and higher education institutions — are expanding digital collections and services to better support the academic community.

Globalization, multidisciplinary research, and the demand for quick access to academic information drive this change.

1.2 Digital Transformation of Academic Libraries

Academic libraries worldwide are shifting from print-centric collections to hybrid and fully digital environments. ICT now enables libraries to automate operations and offer network-based services. With this technology, libraries extend access beyond geography. Digital libraries increase efficiency and provide easy access to vast information resources anytime, anywhere.

National programs such as e-ShodhSindhu, INDEST-AICTE Consortium, UGC-INFONET, and the National Digital Library of India (NDLI) have expanded digital

infrastructure in India's higher education sector. These programs help university libraries provide researchers, instructors, and students with high-quality digital resources. As a result, these libraries now actively support academic achievement, innovation, and research output.

1.3 Concept of Digital Resources

Digital resources refer to information items that people produce, save, access, and use digitally. Technology and network connections enable users to access these materials. Academic libraries offer examples like electronic journals, electronic books, online databases, electronic theses and dissertations (ETDs), digital archives, multimedia resources, and open-access materials.

Digital resources offer users benefits such as immediate access to materials, the ability for multiple users to consult the same resource simultaneously, advanced search tools, and secure digital storage and preservation. These features allow libraries to save physical space, prevent material duplication, and overcome geographic barriers. For researchers and students, this means quicker access to reliable and current information vital for academic success.

1.4 Digital Library Services

Digital library services cover many technology-based services that help users find and access information. These include institutional repositories, electronic reference services, digital circulation systems, alert services, online public access catalogues (OPACs), remote access, and information literacy initiatives.

Digital library services enable libraries to adapt to evolving user needs and extend their reach. These services make information access more convenient, foster greater academic participation, and improve research productivity by streamlining resource discovery and usage. The success of these services depends on robust technology infrastructure, skilled personnel, informed users, and strong institutional backing.

1.5 Role of Digital Resources in Teaching, Learning, and Research

Digital resources strengthen the academic environment of higher education institutions. Students access diverse educational resources for homework, assignments, and independent study. Faculty use digital tools to support academic communication, curriculum development, and creative teaching. Researchers benefit from up-to-date literature, citation databases, and advanced research tools.

During COVID-19, higher education shifted to online and blended learning, so users increased their reliance on digital resources. Academic libraries provide constant access to digital information and services, serving as essential support systems. This period demonstrated the strategic role of digital libraries in maintaining resilience and continuity.

1.6 Deemed Universities and Their Academic Libraries in India

Deemed-to-be universities hold an important place in India's higher education system. These universities have the autonomy to design curricula, administer tests, and award degrees due to their reputable performance. To support advanced teaching and research, their libraries must maintain high standards for information resources and services.

Institutions in Maharashtra offer fields such as social sciences, sciences, technology, medicine, management, and interdisciplinary studies. Central libraries at these universities support various academic programs and research projects, acting as knowledge centers. To assess these libraries' contributions, one must understand their present state and how users utilize digital resources and services.

This Study Covers the Following Deemed Universities:-

Table 1.1: List of Deemed Universities of Maharashtra State Under the Scope of the Study

Sr. No.	Name of the Deemed Universities
1	Tata Institute of Social Sciences, Mumbai
2	International Institute for Population Sciences, Mumbai
3	Tilak Maharashtra Vidyapeeth, Pune
4	Central Institute of Fisheries Education, Mumbai
5	Deccan College Postgraduate & Research Institute Pune
6	Gokhale Institute of Politics & Economics, Pune
7	Indira Gandhi Institute of Development Research, Goregaon, Mumbai
8	Bharati Vidyapeeth, Pune
9	Institute of Armament Technology, Pune
10	Padmashree Dr. D.Y. Patil Vidyapeeth, Mumbai
11	SYMBIOSIS International University, Pune
12	Tata Institute of Fundamental Research, Mumbai
13	Dr. D.Y. Patil Vidyapeeth Sant Tukaram Nagar, Pimpri, Pune
14	Pravara Institute of Medical Sciences, Ahmednagar
15	Narsee Monjee Institute of Management Studies, Mumbai
16	D.Y. Patil Educational Society, Kolhapur
17	Datta Meghe Institute of Medical Sciences, Nagpur
18	Krishna Institute of Medical Sciences, Malakapur
19	Homi Bhabha National Institute, Bhabha Atomic Research Centre, Mumbai.
20	M.G.M. Institute of Health Sciences, Mumbai
21	Institute of Chemical Technology, Mumbai

1.7 Scope and Limitations of the Research Study

This study assesses the central libraries of UGC-approved Deemed Universities in Maharashtra, focusing on those established before 2010. Since then, only private universities have been founded, so the study scope and data are limited to 2010 and earlier.

It evaluated the digital resources in these central libraries and examined how such resources can improve library services for users. The presence of 21 deemed universities in Maharashtra defines the study's scope.

1.8 Objective of the Study

The following are the objectives of this study:

1. Identify digital resource availability in declared Deemed University libraries.
2. To discover the purpose of using digital resources.

3. To examine users' awareness of the digital resources accessible in the libraries of deemed institutions.
4. To investigate how university library users, use digital resources.
5. Identify the digital services that libraries give to users through digital resources.
6. To investigate the users' perceptions of the influence of digital resources on their academic development.
7. To investigate the issues encountered by users when accessing and using digital resources.

1.9 Review of Literature:

The researcher reviewed published sources on the topic and found several relevant studies. The literature review is divided into nine areas. Electronic databases like ProQuest, EBSCO, and Emerald were searched. Theses and Dissertations on Shodhganga and several freely available library science sources were also used to find articles.

1.10 Rationale and Significance of the Study

Despite large investments in digital resources and ICT, awareness, use, and satisfaction levels still vary among library users. Evaluating digital resources and services is necessary to see how well they meet users' academic needs.

This monograph presents an empirical study of central libraries in Maharashtra's deemed universities. The research measures user behavior, satisfaction, academic impact, availability of digital resources, and digital service provision. The findings provide actionable insights for library professionals, university leaders, and policymakers to enhance digital library services.

1.11 Organization of the Monograph

- **Chapter 1** – Introduction
- **Chapter 2** – Review of Literature on Digital Resources and Services in Academic Libraries
- **Chapter 3** – Deemed Universities and their Library Ecosystem in Maharashtra
- **Chapter 4** – Digital Resources & Services: Concepts and Practices in Academic Libraries.
- **Chapter 5** – Research Methodology
- **Chapter 6** – Data Analysis –Librarian Perspectives and Users Perspectives
- **Chapter 7** – Key Findings, Policy Implications and Best Practices.
- **Chapter 8** – Conclusion, Recommendations, Policy Implications & Future Research

There are eight chapters in the monograph. The conceptual framework and importance of digital resources and services in higher education are introduced in Chapter 1. A critical overview of related literature is presented in Chapter 2. An overview of Maharashtra's Deemed Universities and their library ecosystems is given in Chapter 3. The ideas and procedures pertaining to digital resources and services are covered in Chapter 4. The research Method used for the study is described in Chapter 5. Library and user data are analyzed in Chapter 6. Key findings and their consequences are presented in Chapter 7, and the study concludes with suggestions and future research areas in Chapter 8.

CHAPTER 2

REVIEW OF LITERATURE ON DIGITAL RESOURCES AND SERVICES IN ACADEMIC LIBRARIES

Introduction

Any scientific work must include a review of relevant literature to place the study in the broader context of previous research and to help detect trends, gaps, and emerging topics. In the field of Library and Information Science (LIS), research on digital resources and services has expanded significantly with the growth of information and communication technologies and the increasing reliance on electronic information systems in higher education.

This chapter presents a critical and thematic review of national and international studies related to digital resources, digital library services, user behavior, information-seeking patterns, information literacy, and the evaluation of digital collections in academic libraries. The purpose of this review is to establish the theoretical and empirical foundation for the present study and to justify the need for an evaluative investigation of digital resources and services in deemed university libraries of Maharashtra.

2.1. Why Conduct a Literature Search?

A literature search or review assists a researcher in creating links to existing material and developing steps for drafting the research report. The literature study is important because: (www.owlcation.com/misc/lietrature_review)

- A literature review builds rapport with the audience and prevents accidental plagiarism.
- It helps researchers focus on a specific research issue.
- A literature review indicates the researcher's understanding of the topic and subject area.
- Justifies the reason for conducting research.
- Enables support for theoretical frameworks and learning from scholars' experiences.

It aids in determining the methodologies to be used and shaping the research project.

Highlights gaps in prior research and improvements to the subject topic.

2.2. Definition of Literature Review

According to Cooper (1988), "A literature review uses as its database reports of primary or original scholarship a does not report new primary scholarship itself. The primary report used in the literature may be verbal, but most because reports are written in documents. The types of scholarship may be empirical, theoretical critical analytic, or methodological in nature. Second, a literature review seeks to describe, summarize, evaluate, clarify, and /or integrate the content of the primary report."

2.3. Purpose of Literature Review

A literature review involves the systematic examination, analysis, and synthesis of scholarly works relevant to a specific research area. It helps researchers understand how a topic has been previously explored, the methodologies employed, and the conclusions drawn by earlier studies. Reviews of the literature are essential for identifying best practices, challenges, and user expectations regarding digital information systems in the context of digital libraries.

The review of literature in this monograph serves multiple purposes: it provides conceptual clarity on digital resources and services, highlights major research findings on their use and impact, and identifies research gaps that warrant

further investigation. By examining earlier studies, the present work builds upon existing knowledge while offering new insights specific to deemed university libraries in Maharashtra.

2.4. Facets / Subtopics wise Selected Literature Review

The main objective of the study is to review the use of digital resources and services provided by Deemed University Libraries to users. In the current investigation, the researcher has tried to highlight the literature review under eight broad headings. A review of related literature helps investigators become familiar with current knowledge in the field or area in which they will conduct research. Several studies have been undertaken worldwide on the use of electronic resources in various libraries and information centers. The existing literature shows that almost all developed libraries worldwide offer electronic information services to their respective clientele. In India, the most extensive and central university libraries are the leaders in providing e-resources and services, but on a limited scale. A brief review of subsequent studies provides a comprehensive picture of the status of e-resources and services in contemporary higher education libraries.

The topic has subtopics, with articles arranged chronologically, from older to newer. Literature reflects the history of the Usage of Digital resources and services. The literature review is thoughtfully organized, shedding light on key aspects or facets under distinct subheadings:

1. Digital Resources in University Libraries
2. Impact of Digital Resources on Academic Activities
3. Digital Library Services in Academic Institutions
4. Information Seeking by Librarians and Users:
5. Awareness and Utilization of Digital Resources
6. Information Literacy and User Training
7. Evaluation of Digital Resources and Services

Digital Resources in University Libraries

Digital resources are becoming increasingly important in university libraries, according to a large body of literature. Studies from several nations show that online databases, electronic books, and electronic journals are now the most widely utilized information sources by researchers, professors, and students. Scholars have observed that compared to traditional print collections, digital resources facilitate academic communication more successfully and improve access to up-to-date, reliable material.

Numerous studies show that better academic achievement and more productive research have resulted from the availability of digital resources. Because of their accessibility, search capabilities, and remote information retrieval, users favour digital resources. Disparities in access and usage, which are frequently impacted by institutional infrastructure, subscription coverage, and user awareness, are also highlighted in the research.

Kashyap, S. R., & Sahu, D. (2021). The Authors explained that E-resources are now crucial study tools for college students because they help them prepare notes, assignments, seminars, and other projects. In this situation, most P.G. College Science students in the Dhamtari district of Chhattisgarh use online resources, such as electronic books, newspapers, magazines, and P.G. Pathshala. Overall, this study's findings revealed that most respondents spend between one and two hours daily online. The majority of respondents—278 (78.97%)—use electronic books; 343 (94.44%) utilize electronic resources for their research; and the biggest proportion of respondents—75 (21.31%)—spend two to three hours using electronic resources. When using electronic resources, a maximum of 229 (65.06%) respondents reported sluggish downloads; the largest percentage of respondents, 260 (73.86%),

expressed high satisfaction with e-resources, while 69 (19.60%), 13 (3.69%), and 10 (2.84%) expressed only moderate satisfaction.

Burhansab, P. et al (2020) This study examined the awareness and utilization of electronic resources among library users at selected colleges of Solapur University. The survey found that library patrons are aware of and use e-resources. E-resources help library users locate, retrieve, and share research. Electronic resources boosted research output. E-databases, e-research reports, and e-journals were most used. Research scientists invest heavily in these resources. Continuous information literacy training, focusing on electronic information retrieval, would also improve the utilization of electronic resources and understanding their many benefits. To search independently, library customers need user training. To simplify electronic search, advanced search tactics, regulated vocabulary, and educational internet use should be taught. Computer and information retrieval abilities must be regularly updated to keep up with information communication technologies.

Mallikarjuna et al. (2020). studied that The Faculty members used electronic information resources and services. The higher education system is undergoing significant changes due to the rapid development of information and communication technology. Higher education plays a significant role and is one of the key drivers for an individual's growth, performance, and competitiveness at the national and international levels in the twenty-first century. E-resources are significantly advancing users' understanding worldwide. In this regard, this article has reviewed the existing literature on faculty members' awareness of e-resources, the use of the Internet, and e-services across different college libraries. The further literature review also covers the user's search strategy and preferred search engines while searching for information online.

Kwafoa, Anhwere, and Manu (2019) examined the University of Cape Coast Students' Use of EIR. The study's findings indicate that although students are aware of the EIR services offered by the university library, they need to fully take advantage of them to support their academic goals, as they lack information literacy skills. Few people could participate in the Library's information literacy initiatives. The results also showed that most students used desktop computers, laptops, iPads, and mobile phones to access online resources on campus. It was discovered that the goals of using EIR include staying current on the news in the relevant field of study, updating class notes, conducting research, finishing assignments, and writing project work.

Sharma & Sharma (2018) examined the availability and use of e-resources at private engineering college libraries in UP, India. The study aims to determine whether CD-ROM databases, e-journals, and online databases are available, useful, effective, and used. Library users received questionnaires that the authors readily distributed to 5 engineering colleges. The study's conclusions show that all colleges' libraries have e-journals, online, and CD-ROM databases. It found that library customers were using EIR sparingly. The study recommended expanded e-resource accessibility due to its benefit in addressing users' research and academic needs.

Patel & Darbar (2017) discovered that e-resources, including the Internet, Wi-Fi facilities, e-books, e-journals, thesis and projects, and e-databases, were accessible to students after examining the availability and use of e-resources by C.K.S.V.I.M. library users. With 92.34% of students responding, it was determined that timely and accurate information, quick retrieval, and simple access were the driving forces behind students' use of EIR. Students use E-resources to gather up-to-date information, work on assignments, prepare for tests, create and publish research papers, articles, or books, and conduct research (writing dissertations or project work).

Bhat and Ganaie (2016) conducted a survey at the Dr. Y. S. Parmar University of Horticulture and Forestry to examine how the academic community there uses electronic information resources. The questionnaire approach was used to gather data. According to the study, users of electronic information resources favor both print and electronic formats. In the case of electronic versions, most users prefer online access. Users' preferences for format and access

mode were similar across user types. E-journals from the CeRA collaboration, A.G.R.I.S., and C.A.B.I. databases are frequently utilized electronic information sources in the Parmar University library. Although the C.A.B. e-book database and the Krishiprabha thesis database include many e-book and e-thesis collections, consumers use them infrequently. Three user categories differ in their preferences for the use of indexing and abstracting databases, electronic journals, and electronic thesis collections; however, this is not true for books.

Krishnamurthy, C, and Awari, V. H. (2015) explained the use of electronic information resources, such as CD-ROM databases, web resources, e-journal databases, and internet resources. Their effects on library users, as well as the awareness of these resources among P.G. students at the University of Agricultural Sciences, Dharwad, have been the subjects of research by Krishnamurthy and Awari (2015). According to a survey, most respondents (95.96%) know electronic resources. It was also found that more respondents (100%) use print resources than electronic ones (9.9%) to find and access information. It also looks at how well-known CeRA is. According to the data, 45.40% of respondents know CeRA consortia. It also looked at how much Internet use each respondent had. E-resources are more convenient than print resources for finding and identifying information. Most respondents believed they needed the training to filter online content effectively

Zhang, L., Ye, P., and Liu, Q (2011) studied the use of online resources at seven colleges in Wuhan, China. This study's objective was to provide information on the behavior of Chinese information consumers. The objective was to assist in developing more e-resources by producers and suppliers. The findings revealed that male users outperformed female users in the National Science and Technology Library, with graduates and young employees making up the majority of users. According to the research, publishers of electronic resources should provide more foreign literature, and service providers should raise the bar on their work.

In a questionnaire-based study, the report provides critical findings on students' use of electronic resources and suggestions for boosting Use.

Impact of Digital Resources on Academic Activities

The effects of digital resources on research, teaching, and learning have been the subject of several empirical studies. Research repeatedly indicates that digital resources have a favorable impact on academic growth by promoting interdisciplinary study, improving research quality, and supporting autonomous learning. Scholars have noted that access to electronic journals and databases greatly enhances research productivity and literature review. However, several studies warn that efficient utilization is not guaranteed by the sheer availability of digital materials. Information overload, poor search skills, and inadequate training are among the factors that may limit the academic benefits of digital resources. These results highlight the value of ongoing assistance from library personnel and user education.

Prafulla, A., & Chowdappa, N. (2019). The Authors quantified the relationship between the current engineering curriculum and the typical engineering student's use of electronic resources in their article, "E-Resource Consumption Impact in direct correlation to the Engineering Curriculum." This research highlights the most pertinent years, the areas with the greatest influence, and the factors that have contributed to the students' growing use of electronic resources during their four years as engineering students.

Bhat, Nazir A. (2019). In his 2019 work titled "Impact of Electronic Resources on the Mindset of Researchers," Bhat, Nazir Ahmad, evaluated the effects of the introduction of electronic information resources (EIR) on several essential characteristics of the research activity throughout agricultural libraries of Northern India. This investigation looked at six distinct facets. A simple Yes/No option was used to collect user responses to each statement in the study. The advent of electronic resources and improvements in ICT, according to most respondents (92.94%), and problem identification (51.81%) have made doing literature reviews simpler and quicker. The desire of respondents to conduct

additional research has increased (86.62%). Additionally, users have been able to finish and publish their research projects faster than was necessary during the print period (84.31% vs. 89.97%). An additional 46.26% of respondents agreed that it is now easy and quick to compare the findings of one study with those of other studies in the technology era.

Banker (2018). Although this is a primary goal for them, their research indicates two major problems inhibiting institutions from employing electronic resources more widely. First, adopting these resources, which may already have been attempted in one subject area, spreads slowly across an institution due to staff skill disparities and a need for internal dissemination of findings on e-resource utilization. This might be solved shortly as institutions adopt e-learning tactics and programs. These organizations will be able to guide the adoption of new e-learning advancements, help disseminate information, and train workers to use these tools. Second, institutional coordination is not very strong outside of the BLE. It could maximize the use of e-resources by encouraging partner institutions to split the cost of these technologies or by exchanging best practices in this field. According to the survey, the cooperating institutions are eager to collaborate on this level.

Natarajan, M. (2017). His article is titled "Use and Impact of Electronic Resources by Information Science Students at Jimma University, Jimma, Ethiopia." This essay explains how to use the e-resources and services provided by the social science library at Jimma University. The paper aims to determine how frequently information science students use such e-resources and how often and from which sources they acquire their information. They were also questioned regarding their preference for print or electronic journal formats. Since more information science students are aware of these tools and services, the use of electronic journals has increased. Due to their accessibility throughout the campus, they access these resources in departments and dormitories more often than at the Library. Daily attendance at the Library has been dropping off.

Ajayi, Shorunke, and Aboyade (2014) conducted a study to examine how students' use of electronic resources at Nigerian universities influences their reading habits. According to the survey, students used news, journals, and books most frequently as electronic resources. 90.57% of respondents said online resources improved their reading habits, and 88.68% said they did it frequently. Most respondents (71.17%) preferred electronic materials to printed ones. Poor internet access is a barrier to utilizing e-resources at the Library, according to 73.11% of respondents. In comparison, 46.69% of respondents said that not being proficient with e-resources is the largest obstacle.

Sivathaasan, Murugatha & Murugathas C. (2014). To determine attitudes towards the use of electronic information resources (E.I.S.) in medical libraries and the impact of e-resource use on academic teaching, the University of Jaffna in Sri Lanka conducted a study among medical students and academic staff. The results showed that opinions regarding electronic information sources (E.I.S.) varied among academic staff and students but were not influenced by respondents' gender or age.

Digital Library Services in Academic Institutions

Digital library services have been widely discussed in LIS literature as essential mechanisms for improving access to electronic information. Services such as online public access catalogues (OPACs), remote access facilities, electronic reference services, alert services, and institutional repositories are considered integral components of modern academic libraries.

According to research, digital services' usability, dependability, and alignment with user needs all play a significant role in their effectiveness. According to research done at university libraries, patrons like services that provide quick, easy, and customized access to information. However, at many institutions, problems such as personnel incompetence, limited bandwidth, and technical difficulties still affect service quality.

Naik J. (2020) studied how students use library resources and services, focusing on the availability of necessary books and other reading materials. University libraries need to offer students cutting-edge, need-based library services to meet their academic and learning requirements. This study's main goal is to understand how P.G students use library resources and services, particularly students in the Science Department. The researcher's instrument for collecting primary data from the student body in this study was a survey and a questionnaire. The analysis indicates that P.G students pursuing science degrees are satisfied with the Library's services and resources. However, students also advised that the library purchase the most recent editions of books and a reference collection.

Shivakumaraswamy (2019) focused on Mysore City Engineering Colleges' Use of Web-Based Library Services. The study covers Web-Based Reference, Acquisition, Circulation, Cataloguing, Periodical Services, Interlibrary Loan/Document Delivery Services, and issues with users of engineering college libraries in the city of Mysuru using Web-Based Library Services. We were also involved in creating the questionnaire. Students at the engineering institution in Mysuru city had trouble with a well-designed questionnaire. Three hundred questionnaires were personally distributed to engineering college students in Mysuru, and 250 were returned, yielding an 83.3% response rate. Fundamental statistical techniques (S.P.S.S.) and methodologies will be applied to analyse the research data. Table 7.8's results show that (Online general library policies. Only a few respondents (3, 1.2%) who scored 136 (54.4%) believe that the information is "moderately beneficial," with the highest mean value of 4.30 and S.D. of 1.41.

Rose & Vivien (2019) discussed using I.C.T. in libraries to raise the standard of services staff provide to patrons to facilitate research. Since library workers and patrons perform research, I.C.T. in libraries improves such activity. The administration of resources or housekeeping tasks and the manner in which services are provided have all been significantly altered by the Use of I.C.T. in libraries. The integrated library systems that comprise the I.C.T. application tools are frequently used for in-house tasks, including acquisition, cataloging, circulation control, and serials control. The Internet has been widely used as a tool and resource to meet users' informational and Library needs.

Vincent E.O (2018)²⁰ assessed the use of online reference services from librarians' perspectives in a few Nigerian university libraries. After the study, recommendations were given. The authors found that email services ranked first as the general application of online reference services, while a lack of infrastructure ranked first as the cause of non-application.

Adebayo and Adeniran (2018) discussed the significant contributions that information and communication technologies make to the management and delivery of library services, and how these contributions affect sustainable development. The article overviews I.C.T.'s advantages, the Library's contribution to sustainable development, and the difficulties.

Giddaiah (2017) studied university libraries' resources and services. The majority of librarians, according to the study, reported offering recent additions lists, web OPACs, online databases, internet access, electronic journal services, and access to internet resources via library portals. Most universities included in this study have leased lines, V-SAT, or both for internet connections from B.S.N.L., N.K.M., or E.R.N.E.T. It was discovered that the Kuvempu University Library offered special internet services for scheduled caste and scheduled tribe members, with 15 PCs serving as internet nodes that were accessible for free.

Madu & Ngozi (2017) investigated the impact of ICT application on information dissemination in selected libraries of federal universities in South-South Nigeria. The findings showed that I.C.T. had impacted many library activities, especially in reference services, current awareness, bibliographic search, cataloguing, classification, and lending services. However, the surveyed libraries needed more I.C.T. facilities, adequate internet facilities, and low ICT skills.

Asogwa & Anthonia (2016). The authors listed the advantages of internet access in academic libraries and how it masks paper resources. The authors examined the advantages of Internet access over print resources in a classroom setting and emphasized the role of ICT as the foundation of Internet use.

Mathu (20132) This paper focused mostly on resource sharing, methodologies, and approaches. Resources require places to cooperate as well. Concept of resource sharing, benefits, drawbacks, and obstacles to promoting resource sharing through networks, library consortia, and their various roles and responsibilities.

Information Seeking by Librarians and Users

Understanding user information-seeking behavior is a central theme in studies related to digital resources. Research shows that students and researchers increasingly rely on search engines, online databases, and electronic journals as primary sources of information. The shift from mediated to self-directed information searching has changed librarians' roles from information gatekeepers to facilitators and educators.

Bharathi K. and Sujatha H R (2019) The study titled *“Utilization of the Digital Information Resources and Services Provided in the Engineering College Libraries in Karnataka, India: Users' Perspective”* successfully examined how digital resources are used in engineering college libraries. It found significant gaps in access to digital information resources across colleges, despite the growing importance of electronic sources in academic libraries

Rani, P. (2018) This article explains how users can use the Library's resources and services. Each academic Library should create a digitized collection of the materials needed for users and website administration. To determine user satisfaction with reviews, the company must complete data collection on students, teachers, and their perspectives. Defendants are gathered to consider various departments and users, with and without students; faculty users are evaluated for consistency, and analysts have described the details of this exam.

Natarajan (2017) The study found that most respondents are aware of electronic resources and primarily use computers for research, assignments, and publications. Electronic resources are widely preferred and considered essential for modern information and communication, transforming libraries into digital learning centres. However, key issues include slow download speeds, limited internet access, inadequate computer facilities, and lack of power backup.

Sridevi & Ramamurthy (2016) evaluated the use of online resources and services by faculty in independent engineering colleges in Chittoor District. One hundred seventy-five respondents received 225 structured questionnaires. The obtained data were examined for several variables, including the distribution of respondents who used online resources by institution, gender, frequency of access, and search engine use. The study is open only to academic staff at J.N.T.U., Andhra Pradesh. Anantapur-affiliated autonomous engineering colleges in the Chittoor District.

Bhat and Ganaie (2016) explained that departments and office spaces were identified as the most popular locations for accessing and using e-resources. Most respondents stated that this was their preferred location. In contrast, libraries were identified as the least popular location, with the lowest percentage of users stating they preferred them for accessing e-resources. The survey examined the devices respondents preferred for accessing online resources, and it found that most respondents used laptops. Additionally, it was shown that mobile devices were highly popular, as more than half of the respondents approved their use to access online resources. Most users used search engines to find and access electronic resources before the University's website was available. According to the study, searching for electronic resources by title is the most used method, followed by author and keyword searches. Phrase and Boolean searches were identified as the top two methods respondents used to narrow their searches.

Tariq, M. et al. (2015) discussed that a social networking site is one of the most used online information Resources by research students pursuing M.S. and Ph.D. degrees, as emphasized in the Use, Purpose, and Usage Ranking of Online Information Resources by University Research Students. Students individually access many knowledge centers to fulfill their information demands. The most common resources students use for online research are journals and periodicals. Similar to books, H.E.C. e-books, the H.E.C. Journal Database, and the Library Catalog program in terms of usage, with a tiny variation in frequency. Recent researchers have disputed and asserted these conclusions. There are notable variances in the use of online information resources across fields and at the program level. Many different factors influence why respondents visit information sources. For their coursework, research students consult online information sources. They need additional materials to meet their information and knowledge needs, as they have to complete classroom assignments. The Research Project Act requires research students to read earlier works. According to earlier studies, students used online information sources to fulfill their academic and research needs.

Mittal, A., and Sharma, B. K. (2015) The Authors discussed the "Use of Digital Resources by C.C.S.H.A.U., Hisar Library Users: A Case Study. Digital information promotes learning across all subject areas. The current study examines how digital tools might improve user happiness and agricultural education. Users at all levels—undergraduate, graduate, researchers, and faculty—need digital resources to keep up with the latest information, write research papers and assignments, and complete projects. These consumers require access to both print and digital resources. However, people prefer digital resources due to their advantages over print. This study concluded that all user types use digital resources. However, some users are having trouble getting to these resources. By making these resources accessible and organizing them promptly, and by providing orientation and workshops to address availability and teach people how to use new resources, obstacles can be addressed.

Sinha M (2011) discussed the role of e-resources made available to academicians through the INFLIBNET project for various purposes. He also stated that traditional library functions have changed significantly in the current century of e-resources and are now very important in libraries and among library users. The researcher tried to assess how often research scholars and teachers from India's North Eastern Region used the electronic resources available in the Assam University Library through the UGC-INFONET E-Journals/Digital Library Consortium of UGC/INFLIBNET, with a focus on Assam University, Silchar. Most of the teachers, research scholars, and students come from several North Eastern States, with a small number from other regions of the nation, reflecting a truly global population. The investigators have chosen a survey method, which includes distributing a questionnaire, conducting participant observation, and interviewing participants to learn respondents' opinions on using electronic resources (e-journals, e-books, and databases) for their academic and research activities.

Saravanan, T., Ushadevi, P., and Senthil, V. (2010) have undertaken a poll to learn about the different search strategies used by internet users to find the needed information. The authors polled students from six disciplines and discussed the many features of the Google search engine. Most of the respondents to this survey were familiar with AND-type search query operations. The study's conclusions indicate that consumers can receive guidance on improving their search abilities. The authors also state that determining what kind of information the user is looking for and how to phrase searches in search engines should come first for information retrieval to be successful.

Spink, A., and Jansen, B. J. (2004) These studies, which looked at Internet search behavior from 1997 to 2003, are summarized by Amanda Spink et al. (2004). The paper's co-authors conducted extensive research studies between 1997 and 2003, and the selected findings from these studies are presented in this article.

The researchers evaluated the subjects of Web searches —how people search the Web using terms in queries during search sessions —and the many types of searches—including those for medical, sex, e-commerce, multimedia, and other information. Their key findings include shifts in search themes from entertainment to e-

commerce queries since 1997. Additional research reveals that many features of Web searching, such as query and search session length, changed relatively little between 1997 and 2003.

The findings highlight the need for regular user orientation, information literacy programs, and training in database and online resource use. Students should be familiarized with consortium journals and subject gateways. Libraries must improve e-resource management, adopt e-discovery tools for unified searching, and maintain updated websites to support higher education and research. To maximize usage, libraries should provide high-speed internet, Wi-Fi, 24-hour reference support, trained technical staff, and adequate infrastructure. Collaboration between library staff and faculty is essential to enhance effective use of e-resources and support academic growth.

The results show a clear shift from print to digital media, with users preferring digital library services over traditional ones. However, the utilization of consortium-based electronic resources varies—some are fully used, while others remain underutilized. The study emphasizes the need to assess e-resource usage before further expansion within the V.T.U. consortium. It also highlights that librarians should take a more proactive role in implementing advanced information technologies, managing digital resources effectively, and establishing proper infrastructure to enhance optimal use of digital information services.

Awareness and Utilization of Digital Resources

One important element impacting the use of digital resources and services is user awareness. According to the research, one of the main causes of underutilization is a lack of knowledge about accessible resources. Although many institutions subscribe to a variety of digital resources, consumers frequently do not realize their full potential, according to studies done at Indian university libraries.

Promotional initiatives, including seminars, user training sessions, library websites, and orientation programs, have been found to be successful methods for raising awareness and usage. Researchers emphasize that continuous user engagement is necessary to ensure optimal use of digital collections.

Kaladhar A et al. (2018)³⁶ The study focused on using online tools and services for research and study. The usage of digital resources varies depending on the user type. Most respondents are aware of the Central Library's digital services. Digital services and resources are valuable, but consumers may only select specific ones. Despite high user satisfaction, 8.9% express dissatisfaction with digital resources and services. To ensure that digital resources and services are fully utilized, the Central Library should provide user education, orientation, information literacy training, and support.

Anyim, W O (2018) emphasized that university e-libraries supplement traditional libraries by providing students, instructors, staff, academic researchers, and university community members with free access to important digital content. Though numerous resources and services are provided, Tables V and VI reveal that university e-libraries in Kogi State, Nigeria, lack sufficient resources and services. 118 respondents (49%) were dissatisfied with digital library content, while 117 (49%) were dissatisfied with digital library services at Nigerian institutions. Respondents identified opportunities for improvement and innovation to enhance e-library resource access and retrieval, given the e-central Library's importance to university research.

Sharma Y. (2016) Urged that librarians be adequately equipped to carry out their responsibilities as knowledge managers and knowledge gatekeepers. Electronic resources provide an unparalleled opportunity to expand the quantity of information consumers may access. The need to educate users on how to effectively use e-resources cannot be emphasized enough. One of the most important factors in the success of library services is the marketing of e-resources to increase user awareness and the necessary training to make it simpler for users to access the information they require. It is widely held that user education should be a core component of the curriculum.

Collaborative preparation allows teacher librarians and other teaching professionals to quickly recognize and satisfy students' needs.

As a result, libraries should implement comprehensive marketing strategies to inform customers about available resources, followed by effective user training to facilitate access.

Masese J M, et al. (2016) The study examined how universities in Kisii County can improve their e-resource availability and utilization. Academic libraries have invested much in subscribing to or purchasing e-resources, as well as recruiting competent personnel to provide necessary services. E-resources are useful for research and development, remote client service, and print supplementing. Library e-resources are changing as a result of technological advances. Both staff and consumers require constant training. Collection development management must build a user-centric policy. This study effectively fulfills user needs. To enhance e-resource consumption, library users, staff, and management must interact. All stakeholders will be trained to improve their performance. All parties must communicate in order to provide the best service. Libraries and information centers must adopt information and communication technology to remain current. Libraries employ computers and cell phones for automation. Patron-library contact should also occur through the library administration system.

This research focuses on user needs. The proposals in this study are based on the findings. E-resources allow libraries and information experts to reduce space, shelving, and maintenance costs. Thus, developing an I.C.T. infrastructure to facilitate e-resource access and use necessitates a large financial commitment. After installation, the system's advantages exceed its drawbacks. Kenya's Digi-School provides laptop computers to elementary school children as part of their academic curriculum. This study will contribute to establishing e-resource access and utilization. It will help inform the teachers who will be teaching these students.

Knight (2013) described the librarians setting up an electronic library at Northern Caribbean University to facilitate online learning and improve access to library materials. This objective has been achieved by the e-library, which has greatly expanded library resource consumption. Graduate, postgraduate, and evening institute students who need more time to use the physical library resources have found it relevant.

In this study, the researcher advised that the Federal Ministry of Education and other organizations should fund university libraries to purchase e-library materials for academic scholars; universities should improve e-library resources and services to make information retrieval easier; E-library users need regular information retrieval training; qualified digital librarians with financial consequences should build an I.C.T. platform to sustain e-resource availability and After installation, the system's advantages exceed its drawbacks. Kenya's Digi-School provides laptop computers to elementary school children as part of their academic curriculum. This study will help to establish e-resource utilization and access. It will help the instructors who will teach these children.

Information Literacy and User Training

In the context of digital libraries, information literacy has become a major challenge. Academic achievement depends on one's capacity to find, assess, and apply digital information efficiently. Several studies emphasize the importance of incorporating information literacy courses into the academic program to equip users with the digital skills they need.

User trust and satisfaction with digital resources have been shown to increase through library-led training programs, interactive seminars, and online tutorials. According to the literature, information literacy programs must be continuous and flexible enough to accommodate evolving user requirements and technology breakthroughs.

Huang Q. (2022) This study examined how Chinese university libraries now teach information literacy to overseas students. From April 2019 to July 2020, the author utilized Questionnaire Star to poll 152 librarians from 117 Chinese

university libraries, including 35 institutions that are part of the country's aim to build world-class universities and disciplines. Shanghai Jiao Tong University examined 35 international students on library information literacy teaching. The study examines survey data to evaluate foreign students' information literacy education in Chinese academic libraries and proposes strategies to improve it. The "Double First-Class" strategy has made internationalization the key to establishing a world-class institution.

Huang J. and Jei G. (2020) This article investigated Chinese mobile information literacy education. The research analyzed 39 Project 985 university libraries, with an emphasis on the East China Normal University Library. Data and examples were obtained via the internet and mobile questionnaires between September 1, 2016, and March 31, 2019. Based on survey data and East China Normal University's WeChat Practice, this paper presents practical experience, potential approaches, and ideas for promoting mobile information literacy teaching on the WeChat platform. Academic libraries in China provide I.L. instruction through courses, seminars, freshman orientation, and campus events. The data for this investigation were organized into scenarios. Overall, many mobile users use their cellphones to look up information and read. The 985 Chinese university libraries seek to be "wherever users are, wherever the library is."

Alagu and Thanukodi (2018). This study assessed how effectively students' information literacy skills were assessed. The study examined a range of areas, including familiarity with library resources and services, physical and electronic publications, the online catalogue, information and communication technologies, and online databases. According to the survey, most students use the Internet through the University's Central Library, and the majority of students use a range of information sources to broaden their knowledge in preparation for conferences, seminars, and journal article writing.

Bansode and Viswe (2017) This study analyzed the information and communication technology (ICT) literacy of library professionals working in Maharashtra's university libraries. They found that most library personnel had basic I.C.T. literacy skills and recommended that university libraries provide regular in-house training sessions.

According to **Femi and Oyinade's (2017)** study, information literacy lessons are offered to students in the medical school's foundation year through the senior cycle, the nursing school's first through fourth years, the medical graduation program, and the Master's in Nursing program. Academic members and researchers can also participate in on-demand seminars. The Library has delivered a total of 150 hours of training yearly.

It improves the use of the Library's subscription e-resources. The study also found that librarians are masters at applying criteria to information searches, selecting high-quality content, and teaching users how to evaluate the quality of health information. In addition, librarians aid health professionals in their goal of continuous learning. Our meetings with the students enabled them to use the portal to access library resources.

Tallolli & Mulla (2016). The Engineering College Libraries' websites were consulted to investigate information resources and library service literacy. The library's contribution to the organization's education and knowledge growth is critical in engineering education. The Library seeks to provide students with information when they need it. It is a major problem for them to consistently give reams of material in a way that makes things easy to examine. This study focuses on a few characteristics that indicate the importance of library websites in promoting public knowledge of available materials and services, as well as improving such services for users.

Douglas and Rabinowitz (2016). The author reviewed the surveys, interviews, and a rubric-based evaluation of student research essays utilized in the study. An action team from St. Mary's College of Maryland evaluated faculty-librarian collaboration during a First-Year Seminar (F.Y.S.). The course influenced students' exhibited information literacy (I.L.) abilities and investigated the experiences, attitudes, and behavior of instructors, librarians, and first-year students.

Chun and Chaw (2016) investigated digital literacy, which promoted online behaviors while also aiding in information management and critical thinking. The learning ability of this work is assessed using four digital literacy constructs: foundations, background knowledge, central competencies, and attitudes and perspectives. Students in a blended learning environment at a local institution responded regarding the relationships between effective learning and four aspects of digital literacy. Three of the four demonstrate a valid, statistically significant relationship with the concept of successful learning.

Sandercock's (2016) study investigated views on information literacy (I.L.) and the importance of providing students with the skills and search strategies to handle massive volumes of information and select acceptable, reliable sources for both academic and non-academic use. Students at Qatar's North Atlantic Technical Institute, a technical institution in the Middle East, worked on engineering technology, computer technology, business studies, and health sciences projects. This study employed a web-based survey to assess two broad impressions of student information literacy using the Society of College, National, and University Libraries' (S.C.O.N.U.L.) definition. according to the questionnaire, there is a substantial gap in students' skills across the seven ability categories.

The findings revealed that students rated their I.L. skills lower than teachers did. The investigation recommended that specific efforts be made to improve the skills of teachers and pupils to enhance the quality of their search results.

Evaluation of Digital Resources and Services

Evaluation studies are a key component of LIS research on digital libraries. These studies analyze the sufficiency, usefulness, and effect of digital resources and services. Popular assessment criteria include availability, accessibility, frequency of use, user satisfaction, and academic impact.

Researchers suggest that evaluation studies provide useful input to library administration and support informed decision-making about collection growth and service enhancement. Despite an increasing number of assessment studies, there has been little research on deemed university libraries, particularly in Maharashtra.

Vishwas J. (2019). The survey highlighted the relative prevalence of e-resource accessibility and availability in Indian academic libraries. The academic community relies largely on electronic resources to do its work. To be productive, users must make full use of internet resources. This research examines customer satisfaction with the facilities, services, and resources at Panjab University's Library in Chandigarh. And how simple it is to use electronic resources.

Ramakrishna (2016) defined how the Deemed University Library in Andhra Pradesh (AP), India, employs electronic information resources and services. Researchers were given a questionnaire to complete, and their responses were analysed. This study accounted for all available resources, services, library hours, internet access, and automated services. The study's findings highlighted the services and resources of a few well-known university libraries in Andhra Pradesh, India, that consumers found effective in transmitting realistic education.

Das S. (2015). The author defined collection development as the process of planning for the systematic and organized establishment of public collections. Academic libraries provide two forms of collection development: centralized and decentralized systems. Under a centralized system, the central Library is fully responsible for managing libraries, whereas under a decentralized system, departmental academic libraries are responsible for their own management. To summarize the existing situation of the university libraries' e-resources and to propose practical guidelines for a better collection development program. Both university libraries employ a decentralized library system. However, the two central libraries' e-resource collections are resilient and autonomous. Attempting to implement the choice made based on existing cash availability, and providing timely user information on collection development

Varatharajan N (2014) investigated how electronic resources are becoming an increasingly important component of library collection development initiatives. Although the study is primarily concerned with academic and research libraries, it will be useful to a wide range of libraries. Materials that need computer access, whether via a desktop, laptop, or mobile device, are referred to as "Electronic Resources." They can be accessed locally or remotely over the Internet. Streaming media, online databases, electronic books or book collections, and electronic journals are some examples.

Singh (2013) investigated how library collections are used. The Central Library of Dayalbagh Educational Institutions (Deemed University), Agra, provides users with access to electronic journals, databases, internet services, OPAC searches, reprography services, and information on Shodhganga and Shodhgangotri. This study evaluated only registered users and collected data via a standardized questionnaire. This study is valuable to library consumers and employs questionnaire methodologies.

Patrick (2013) acknowledged the advantages and disadvantages of digitizing library resources and establishing digital repositories in the University of Malawi libraries. He collected data by sending an online questionnaire to college libraries, the I.C.T. director, the system administrator, and assistant librarians or repository coordinators. The study's findings revealed that U.N.I.M.A. libraries are digitizing library resources and building digital repositories at a moderate rate. Bandwidth has grown as resources have become more accessible, yet it remains limited due to scarcity.

Veeranjaneyulu K (2012) performed research to investigate one of the librarian's most important duties: gathering relevant print and non-print materials for the library. He must be knowledgeable of the kind of materials that academics, personnel, and researchers demand. For example, if a firm is active in agriculture, it should seek publications from other companies or organizations through purchases, subscriptions, contributions, or book exchanges. A good library should have a diverse collection of books, journals, CDs, floppies, cassettes (audio-visual), online resources, pamphlets, and reports.

2.5 Research Gaps Identified

Existing literature clearly establishes that digital resources and services play a central role in academic libraries worldwide. Studies have examined the availability and use of e-journals, databases, e-books, and web-based services, highlighting their positive impact on research productivity, teaching effectiveness, and independent learning. Research has also addressed issues such as user awareness, information literacy, infrastructure, and academic outcomes.

However, significant gaps remain. Most studies are institution-specific or regionally limited, with little comprehensive research focused on deemed university libraries, particularly in Maharashtra. Prior research often adopts a fragmented approach, examining digital resources, services, awareness, and user satisfaction separately rather than through an integrated framework. The gap between awareness and effective utilization has also not been sufficiently explored, especially in relation to training, promotional strategies, and institutional policies.

Additionally, limited attention has been given to strategic evaluation, cost-effectiveness, infrastructure adequacy, and diverse user groups. Therefore, a systematic, multi-dimensional, and comparative study of digital resources and services in deemed university libraries in Maharashtra is needed to provide both scholarly and practical insights for improved policy and service development.

This chapter evaluated major studies on digital resources, digital library services, information literacy, user behavior, and evaluative research in academic libraries. The literature emphasizes the need for efficient services, user awareness, and ongoing assessment while highlighting the growing importance of digital resources in higher education. The empirical inquiry given in later chapters of this monograph is based on the identified research gaps

CHAPTER 3

DEEMED UNIVERSITIES AND THEIR LIBRARY ECOSYSTEM IN MAHARASHTRA

Introduction

One important and unique component of the Indian higher education system is made up of deemed-to-be Universities. The University Grants Commission (UGC) honors these institutions for their outstanding academic records, inventiveness, and capacity to support cutting-edge research and teaching. Declared institutions have the freedom to create specialized curricula, use cutting-edge teaching strategies, and set up cutting-edge research facilities. University libraries are essential knowledge support systems in this academic context.

With special reference to Maharashtra, this chapter provides an overview of India's Deemed Universities and looks at the composition, capabilities, and resources of their central libraries.

To provide a contextual basis for the evaluative analysis in subsequent chapters, the emphasis is on understanding the library ecosystem in which digital resources and services are created and delivered.

3.1 Concept and Evolution of Deemed-to-be Universities in India

Section 3 of the University Grants Commission Act, 1956, established the idea of deemed-to-be universities in India. Based on their overall performance, research contributions, and academic standards, institutions recognized under this clause are granted university status. In specialized fields such as science and technology, medicine, business, the social sciences, and interdisciplinary studies, designated universities have become premier institutions over time.

Indian higher education's shifting interests, such as the demand for adaptability, creativity, and global competitiveness, are reflected in the development of designated institutions. These schools frequently place a strong emphasis on internationalization, industry engagement, and research-driven instruction. As a result, their libraries are supposed to provide extensive collections and cutting-edge information services to support advanced academic and research endeavors.

Belowed Chart indicates that in India, 128 deemed universities are total. These so-called universities are dispersed among the nation's 21 states.

3.1.1 State-wise Deemed Universities

Table 3.1 In India, 128 deemed universities are total. These so-called universities are dispersed among the nation's 21 states.

Table 3.1: State-Wise Deemed Universities in India

Sr. No.	State	Number of Deemed Universities
1	Andhra Pradesh	7
2	Arunachal Pradesh	1
3	Bihar	2
4	Chandigarh	1
5	Delhi	11
6	Gujarat	2
7	Haryana	5
8	Jharkhand	2
9	Karnataka	15
10	Kerala	2
11	Madhya Pradesh	3
12	Maharashtra	21
13	Orissa	2
14	Pondicherry	1
15	Punjab	2
16	Rajasthan	8
17	Tamilnadu	29
18	Uttar Pradesh	10
19	Uttarakhand	4
20	West Bengal	1
21	Meghalaya	1
	Total	128

The most deemed universities are in the state of Tamil Nadu. Twenty-nine universities have been designated as such. The only state after that is Maharashtra. Maharashtra has 21 deemed universities accessible. The following states and union territories require recognized universities: Assam, Chhattisgarh, Goa, Himachal Pradesh, Jammu and Kashmir, Manipur, Mizoram, Nagaland, and Sikkim/Trip.

3.1.2 City-wise Deemed Universities in Maharashtra:

Maharashtra is a significant hub for industry and is renowned for its high standards in education. Maharashtra is home to many universities where students can receive a top-notch education. There are numerous reputable educational and Research institutions worldwide. The third-largest state in terms of area is Maharashtra. In Maharashtra, there are 21 designated universities. Of them, there are ten universities in Mumbai, 7 in Pune, and one in Wardha (Nagpur), Kolhapur, Karad (Satara), and Loni. (Ahmednagar)

Table 3.2: City-Wise Deemed Universities in Maharashtra

Sr. No.	Area wise Deemed Universities	Total	Percentage (%)
01	Mumbai	9	34
02	Pune	8	38
03	Ahmednagar	1	5
04	Satara	1	5
05	Kolhapur	1	5
06	Wardha	1	5
	Total Universities	21	

3.2 Growth of Deemed Universities in Maharashtra

When it comes to academic diversity and higher education infrastructure, Maharashtra is among the top states in India. There are many deemed universities in the state that provide courses in a variety of subject areas. The academic and scientific output of the region is greatly enhanced by these institutions, which draw scholars and researchers from both domestic and foreign locations.

Science and technology, health sciences, management, humanities, and transdisciplinary studies are among the fields represented at Maharashtra's deemed universities. Since their central libraries serve a wide range of user groups with diverse information requirements, the efficient administration of digital resources and services is especially crucial.

3.3 Role of Central Libraries in Deemed Universities

The main academic support facilities of recognized universities are central libraries, which make it easier for students to access the information resources needed for research, teaching, and learning. These libraries, which have historically focused on print collections, have gradually moved toward hybrid and digital formats to meet changing user demands.

In addition to creating collections, central libraries are also responsible for organizing information, providing reference services, educating users, and assisting with research. Libraries are increasingly involved in the management of institutional repositories, research analytics platforms, plagiarism detection systems, and electronic resources in the digital world. Funding, personnel experience, institutional regulations, and technology infrastructure all affect how well these roles work.

3.4 Infrastructure and ICT Facilities in Central Libraries

The foundation of digital library services is ICT infrastructure. To facilitate the supply of digital resources, central libraries at recognized institutions usually keep up computer labs, networked systems, fast internet connections, and access management tools. Many institutions now routinely automate library operations using integrated library management systems (ILMS).

Institutional goals, financing trends, and administrative support are among the variables that affect the availability and quality of ICT infrastructure. Reliable access to digital resources and the provision of cutting-edge services like online user assistance, digital repositories, and remote access depend on adequate infrastructure.

3.5 Digital Collections in Deemed University Libraries

In Deemed Universities, digital collections make up a significant portion of the academic library resources. Electronic books, electronic journals, online databases, electronic theses and dissertations, and open-access materials are frequently included in these collections. National consortia like e-ShodhSindhu are frequently used to get subscription-based resources, providing affordable access to top-notch academic material.

Many libraries create institutional repositories in addition to licensed materials in order to preserve and share their institutions' intellectual work. These repositories promote free access to intellectual material and increase the visibility of research output. Strategic planning, ongoing assessment, and user-centered selection procedures are necessary for the creation and upkeep of digital collections.

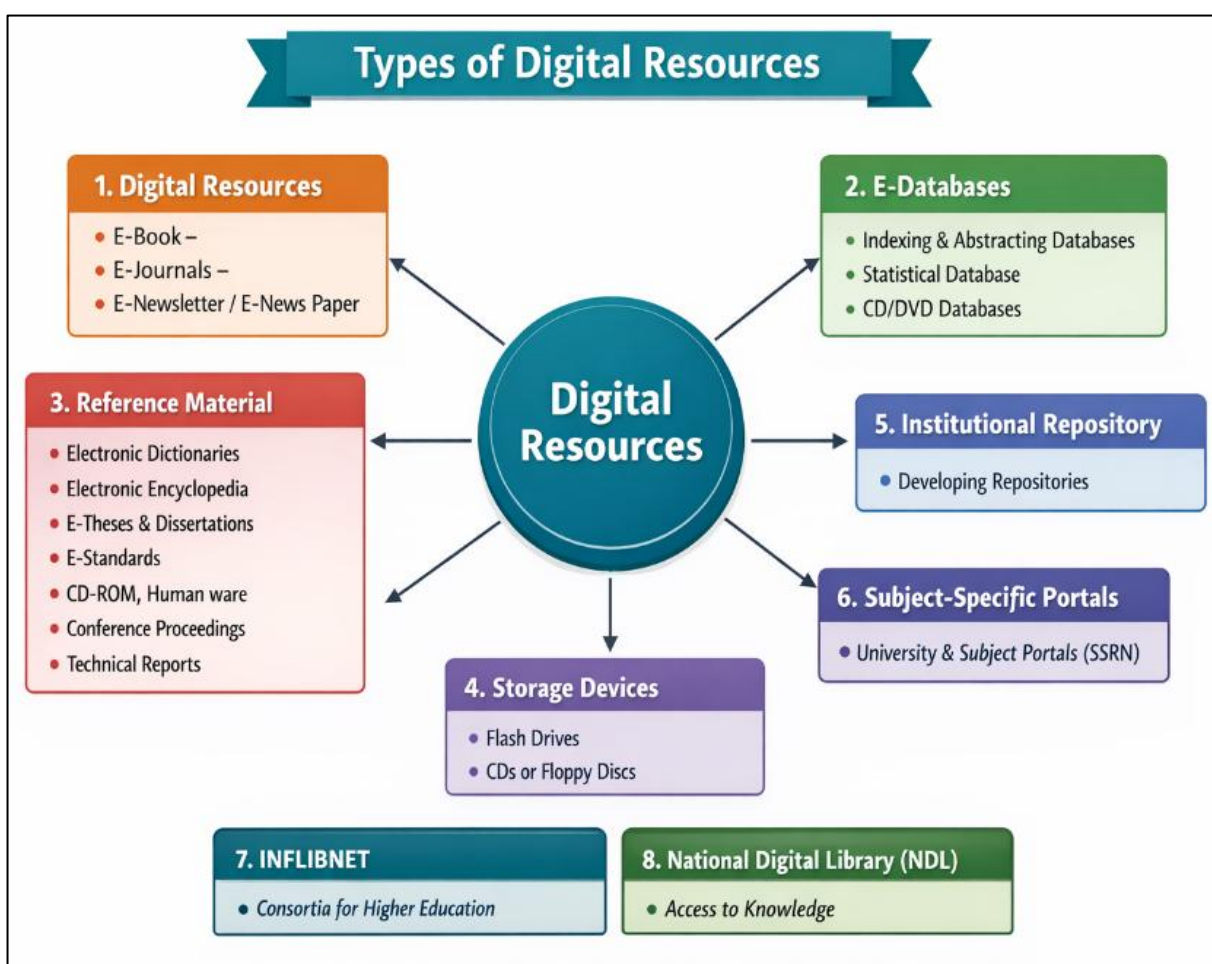


Figure 3.1: Digital Resources Offered by Deemed University Libraries

3.6 Digital Services Offered by Central Libraries

Central libraries of deemed universities offer a range of digital services to improve access to electronic materials and support academic activity. Online public access catalogues, remote access facilities, electronic reference services, alert services, and digital repository access are common services.

Libraries also actively promote research by providing services such as literature searches, plagiarism checks, citation management support, and guidance on research data. The efficacy of these services is dependent on staff competency, user involvement, and institutional commitment to digital innovation.

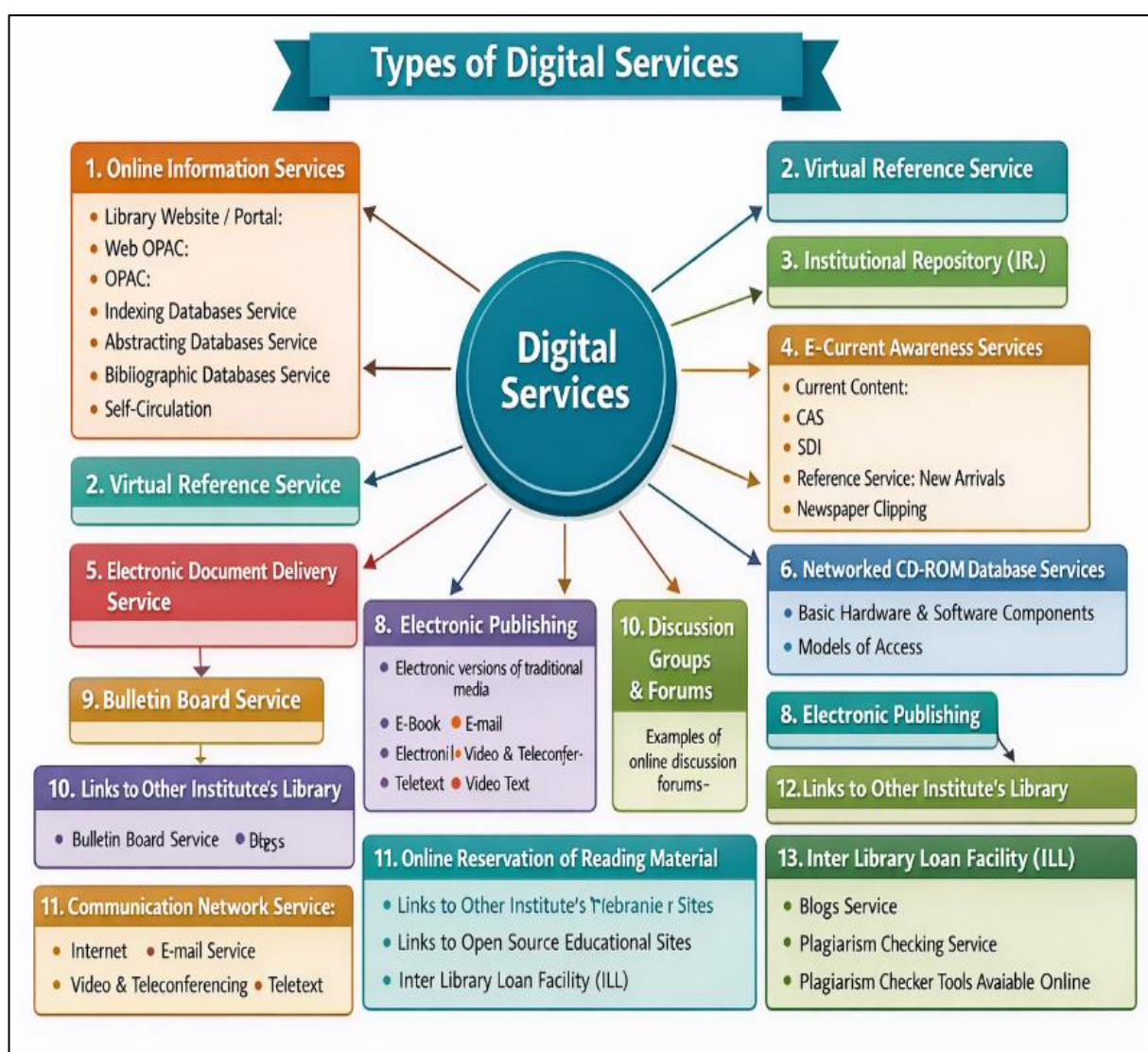


Figure 3.2: Digital Services Offered by Deemed University Libraries

3.7 Users of Deemed University Libraries

The customer base of declared university libraries is broad, including undergraduate and postgraduate students, researchers, faculty members, and administrative personnel. Each user group has different information demands and levels of digital competence. Research academics and faculty members often need sophisticated scholarly resources, whereas students rely on digital materials for coursework and learning support.

Understanding user characteristics and information requirements is critical for developing successful digital services. Libraries must implement user-centered approaches that account for discipline diversity, learning styles, and technology choices.

3.8 Challenges in Managing Digital Resources and Services

Despite substantial advances in digital library development, central libraries at recognized institutions face several obstacles. These include escalating subscription fees, technical obsolescence, license constraints, and the requirement for ongoing employee training. Providing fair access to digital materials and preserving service quality are continuous problems.

User-related difficulties, such as lack of knowledge, poor information literacy skills, and unwillingness to change, all affect the successful use of digital resources. To address these difficulties, strategic planning, institutional support, and long-term investment in capacity building are required.

This chapter offered an overview of Deemed Universities in India, with a focus on Maharashtra, and investigated the function of their central libraries in supporting academic and research activity. It addressed infrastructure, digital collections, services, and the difficulties associated with digital library development. This contextual knowledge serves as the foundation for the monograph's future chapters, which give an evaluation of digital resources and services

CHAPTER 4

DIGITAL RESOURCES AND SERVICES: CONCEPTS AND PRACTICES IN ACADEMIC LIBRARIES

Introduction

The growing use of digital technology in academic libraries has profoundly changed the character of information resources and services. Digital resources and services are becoming central to library operations at higher education institutions, facilitating teaching, learning, and research in increasingly complex, multidisciplinary settings. This chapter explores the conceptual underpinnings, types, and practical applications of digital resources and services in academic libraries, with a focus on designated university libraries.

The chapter presents a theoretical and operational framework for understanding digital library activities, acting as a link between the contextual discussion in previous chapters and the empirical investigation in later chapters.

4.1 Concept of Digital Resources

Digital resources are information assets that are stored, accessed, and used in electronic format. Digital materials, unlike traditional print resources, need access via technological devices and network connectivity. They are characterized by ease of retrieval, multi-user accessibility, and the ability to integrate advanced search and navigation features.

In academic libraries, digital resources encompass a wide range of content types, including scholarly literature, reference materials, research data, and multimedia content. The shift toward digital resources reflects changing user preferences, the growth of online education, and the increasing emphasis on research output and global visibility.

Digital Resources:

The library's digital resources include full-text databases, e-books, e-journals, image collections, multimedia products, and numerical, graphical, and time-based data.

What are Digital Resources?

Delivery via the Internet or optical media is an option. Electronic journals, image collections, full-text databases, and other media-based goods that require computer access are examples of digital resources. Websites, CD-ROMs, cassettes, etc. We can now create and distribute documents digitally thanks to new tools and standards. Librarians are thus compiling information from happier people utilizing digital assets. Digital assets impact the magnetic and optical collections at the university library. As they may be altered and researched, there is frequently no other option; access to information must be more affordable, and they save money on preservation and care. Today's academics are largely Internet-reliant. Information processing, storage, searching, dissemination, and use have all been made easier by information and communication technology and the Internet. Using digital technology, we can produce and store data in a variety of formats while also making it available to others (Dawson, 2000). Information seekers must still visit libraries, even though e-resources are more readily available and transcend space and time.

Definition

1. According to Sukula (2010), "An electronic resource is an electronic information resource that can be accessed on the web, on or off campus. Users can access the information they need at any time."
2. According to the Library and Information Technology Glossary, "Term used to describe all of the information products that a library provides through a computer network."
3. According to Wikipedia, Electronic Resources means "Information (usually a file) which can be stored in electrical signals, usually on a computer; Information available on the Internet."
4. The Gradman glossary states, "A publication in digital format which must be stored and read on a computer device. There are two types: Direct access: these are physical objects such as CD-ROMs, diskettes, computer tapes, and computer cards, containing text, images,
5. According to Islam (2015), "digital resources are those resources that include both born-digital and digitized materials, accessible either from a library's in-house database or via the World Wide Web".
6. According to Liu (2006), "Electronic resources are electronic products that deliver collections of data, including text (full-text), e-journals, image collections, multimedia products, and numerical or graphical data. These resources are commercially available and are produced for distribution. They may be accessed via CD-ROMs, tapes, or the Internet."

Features of Digital Resources

Limited Storage Area- After tens of thousands of years of evolution, information-carrying material consumes less space. It is commonly known that a CD-ROM can store thousands of books. One hundred four billion US Library of Congress books may also be in the pocket.

- **Widespread Adoption** - As long as a communication network is connected, digital information resources can be accessed anywhere, anytime.
- **Without Copies** - Digital resources are crucial. The computer's quick processing speed and limited cache allow more readers to access the same works. A digital library copy is unnecessary. Literature Preservation and Usage Refusal
- Computers and their supporting hardware are required, as are network communication lines, towers, CD-ROM libraries, etc.
- **Facilitate Retrieval** - Ease retrieval. Most digital sources have retrieval software. Other methods include searching by book titles, article titles, authors, keywords, etc.

Types of Digital Resources in Academic libraries

Academic libraries maintain diverse digital collections to meet the varied information needs of their users. Common categories of digital resources include:

Electronic Journals: Peer-reviewed scholarly journals available in electronic format are among the most heavily used digital resources. They provide timely access to current research findings and support advanced research activities.

Electronic Books: E-books give users the freedom to access and use academic literature from remote locations. They are especially beneficial for reference books and textbooks that require frequent consultation.

Online databases include bibliographic, full-text, and citation databases that enable structured access to scholarly material across many fields. These databases provide literature searches, citation monitoring, and study evaluation.

Electronic Theses and Dissertations (ETDs): Digital collections of theses and dissertations help to preserve and promote institutional research output. ETDs are invaluable tools for scholars looking for thorough and innovative investigations.

Open Access Resources: Open-access journals, repositories, and digital archives provide unlimited access to scholarly literature. These sites encourage knowledge sharing while reducing reliance on subscription-based publications.

4.2 Concept of Digital Library Services

Digital library services are technology-enabled services that make digital resources more accessible and help users discover and use knowledge. These services bring traditional library operations into the digital realm while emphasizing user comfort, efficiency, and accessibility.

Digital services are intended to operate outside of traditional library locations and working hours, allowing users to access information resources at any time and from any location. The efficiency of these services depends on technology infrastructure, personnel skills, and user participation.

What are Digital Services?

Libraries and services in the information era have evolved. Online dictionaries, encyclopedias, directories, abstracting and indexing, etc. Modern sources are prioritized in digital libraries. Online technologies have altered the nature of reference and "expert" services. Technology advances at a breakneck pace. Messages, sounds, and images are encoded and sent using modern technologies. Knowledge is stored, shared, and retrieved through technology. Technology allows unprecedented human interaction, cultural and corporate expansion, and worldwide artistic exploitation. Information technology has extended digital library services for information collection, storage, processing, and distribution. Most reference books—dictionaries, encyclopedias, directories, and handbooks can be found online. 50% of primary and secondary sources are available online. CAS, Index Medicus, and Engineering Index are a few examples. Information is provided via digital libraries. According to reports, information gateways efficiently select high-quality content. The topics covered include selection, technical and policy issues, management, standards, conventions, metadata development, browsing, and searching. Free library websites offer online exhibits, collection databases, images, and digital content creation. Digitization makes things easier.

Definition of Digital Library Services

A digital library can enhance library attendance by allowing users to input their data digitally using computers. The electronic journal support service, electronic document delivery, electronic publishing, interlibrary loan, full-text searching, cross-searching specialized abstracting and indexing databases, etc., for learning and teaching have all been improved by today's digital library. The computer that will be networked to a personal computer will store all the data.

According to Gladney H.M et al. (1994), "A digital library service is an assemblage of digital computing, storage, and communications machinery together with the software needed to reproduce, emulate, and extend the services provided by conventional libraries based on paper and other material means of collecting, storing, cataloguing, finding, and disseminating information."

Features of Digital Services

- Access to Web-Based Resources
- Ask-an-Expert
- Audio-visual Service
- Bibliographic Service
- Digital Archives
- Digital reference service
- E-Books
- E-Journals
- Electronic document delivery services
- Electronic Theses and Dissertations
- Email alerts
- ICT-based new library services
- Institutional Repositories
- Internet Access
- Online Public Access Catalogue (OPAC)
- Real-time reference service
- Reference Service
- RSS feeds, or Atom feeds
- Subject Gateways
- Web-based user education

Type of Digital Services:

A. Online Information Services:

These services are available at the online portal, which allows users to converse and access information freely. Simple or complicated online services exist. A bank's online mortgage application is more complicated than a search engine that helps people find information.

- **Library Website/ Portal:** An integrated library system (ILS) with a library portal adds tools and facilities to its circulation and catalog functions. It provides centralized access and administration to library materials and services.
- **Web OPAC:** Web-based or intranet library catalogs are OPACs. Users can search the Web OPAC anytime, anywhere. "WEB OPAC is an independent software designed separately from the Library Application," according to one online explanation.

- **OPAC:** Online Public Access Catalogue. OPAC accesses library collections. Sabine says the library's OPAC database contains author, title, and subject information. Union catalog OPACs exchange databases with numerous libraries.
- **Indexing Databases Service:** Provides document access points and descriptions. Currently, "indexing service" refers mostly to computer programs but also to firms that provide back-of-book, journal, and other indexes. Indexing and abstracting services give document summaries and descriptors for referencing.
- **Abstracting Databases Service:** An abstracting service provides abstracts of publications, often on a subject or group of related topics, typically on a subscription basis.
- **Bibliographic Databases Service:** Bibliographic databases contain references to published material, such as journal and newspaper articles, conference proceedings, reports, government and legal publications, patents, novels, etc. Unlike library catalog entries, bibliographic databases mostly describe articles, conference papers, etc. Keywords, subject classification terms, and abstracts are usually very extensive.
- **Self-Circulation:** Library circulation—lending books and other resources to library users—is called library lending. A library's circulation section is crucial. Public service is provided at the library's circulation or loans desk, usually near the entrance. It lends and accepts returned products. Updates

B. Virtual Reference Service:

Virtual reference is a real-time referral service in which clients use computers or other Internet-based devices to communicate with reference personnel. Online reference databases, synchronous email transactions, and live/real-time online reference systems give service 24 hours a day, seven days a week. Live online reference programs are similar to commercial customer service or help-desk software. These solutions allow consumers and library personnel in many regions and time zones to communicate in real time. Several systems keep knowledge bases for librarians and users. Inquire with a librarian or seek assistance online. Library Services and E-Resources

C. Institutional Repository (IR)

Institutional Repositories (IRs) are digital platforms established by universities and research institutions to **collect, preserve, organize, and disseminate scholarly output**. They function as digital libraries that store and manage both digital and born-digital content created by academic communities.

IRs primarily save and distribute research outputs such as:

- Pre-print and post-print peer-reviewed journal articles
- University monographs
- Electronic Theses and Dissertations (ETDs)
- Conference proceedings
- Working papers and technical reports (grey literature)
- Academic databases and administrative documents
- Course materials and learning objects

The main goals of institutional repositories are to:

- Increase the **global visibility** of institutional research.
- Promote **open access and self-archiving**
- Preserve valuable digital assets, including unpublished or easily lost materials.
- Enhance the **impact, accessibility, and long-term preservation** of scholarly work.

IRs support academic collaboration by making research widely accessible and enabling knowledge exchange within and beyond the university. They also facilitate digital asset management (DAM), ensuring systematic organization, storage, and retrieval of information.

In addition to institutional repositories, there are **disciplinary or subject repositories**, such as **SSOAR** (a global social science repository) and **PsyDok** (a German psychology repository), which provide subject-specific scholarly content.

Overall, institutional repositories play a crucial role in archiving institutional research, supporting academic communication, promoting open access, and strengthening global knowledge exchange.

D. E-Current Awareness Services:

- A current awareness service alerts users to new E-resources in the Resource Centre. Recent awareness bulletins are offered. Selective data transmission. The following services enable the CAS Service.
- **Current Content:** Current Contents, a current awareness database, makes it easy to find full tables of contents, bibliographic data, and abstracts from the latest issues of prestigious intellectual journals.
- **CAS:** CAS alerts readers to new developments. Readers who want the latest in their field need this service. CAS alerts professionals to new publications and library advances. Current Awareness Service informs users about their main interests and related fields. It helps people learn about current advances, especially those in their field.
- **SDI sources** of information on topics of interest: "A library or other information agency provides the selective dissemination of information (SDI) service, which notifies users of new publications, report material, or other sources of information in subjects they have defined."
- **Reference Service:** Digital reference services help library users find information. With the changing technological landscape, digital reference services are vital to libraries. Using computers or other Internet-based tools to communicate with reference workers while away from the library. Electronic reference services are often real-time.
- **New Arrivals:** New Arrivals shelves display new books for library visitors. The library purchases your desired books monthly. This service sends the library's latest additions to your registered email address. After a week, the person who suggested buying these books will receive them. News Clippings
- **Newspaper Clipping:** paper cutout, Magazine or newspaper paragraphs will be taken. Cutting, clipping, pressing—type: extract, excerpt, selection. A piece is selected.

E. Electronic Document Delivery Service:

Obtaining information via electronic means. Libraries require PDF journals and papers. Methods of electronic document distribution fulfil requirements. Database providers, e-journal publishers, commercial web suppliers, and aggregators compete for document delivery services. The document is available for download by customers. Discipline repositories are uncommon. SSOAR is a full-text global social science website, whereas PsyDok is a German psychology research website. Institutional repositories look for both digitized and born-digital content.

F. Networked CD-ROM Database Services:

CD-ROM sources are used more. Use of online databases has declined, significantly affecting library reference services. A librarian must search for a library user in an online reference service due to its cost and user interface. Libraries often give users direct access to CD-ROMs. Unlike online database services, CD-ROMs provide a friendlier user interface and no minute access cost. Customers can enter their search terms, browse results, refine their searches, enter new questions, and print specific results without incurring online costs.

Basic hardware and software components: As end-user searching grows, the library must provide technology and software to access CD-ROM-based information services. There are numerous reasons why CD-ROM-based information services are available. Workstations and CD-ROM drives are examples of computers. Data retrieval software is included on CD-ROMs. The number of CD-ROMs has surpassed 2,000. The same program finds CD-ROM titles from various manufacturers. Leading suppliers use competing software. A library with several CD-ROM vendors may require multiple retrieval programs. Access the CDs; DOS workstations require Microsoft CD-ROM Extensions. The 660-megabyte capacity of CD-ROM discs exceeds the 32-megabyte limit of early DOS. MS-DOS now supports CD-ROM data access. MSCDEX and the device driver are Microsoft CD-ROM Extensions. EXE. The device driver is brand-specific, whereas MSCDEX is generic. The majority of CD-ROM drive manufacturers provide drivers. CD-ROM:

Models of Access:

Workstations and CD-ROM titles vary by library. The optimum CD-ROM workstation configuration depends on library usage, CD-ROM titles, and budget. Library CD-ROM access usually falls into several categories:

- **One workstation and CD-ROM database** - A single CD-ROM product is mounted on a microcomputer workstation with a single CD-ROM drive. It is the easiest.
- **Multiple databases on CD-ROM, one workstation** - Libraries with several CD-ROM titles, but just one workstation can choose from several options.
- Consumers can transfer discs between databases with a single CD-ROM. Chain multiple CD-ROM drives to a workstation to access several databases without switching discs or support multiple-disc databases. The Pioneer DRM-600 is a CD-ROM money changer. Users can instantly switch between six discs in this moneychanger.
- **Multiple workstations and CD-ROM databases**- CD-ROM adoption may increase library workstations. Some CD-ROM databases are on some workstations, and some on others, or all discs can be moved between workstations. In this case, the user must load the database disc into the workstation. For sharing a database, different versions of the application must be acquired. Several CD-ROM database subscriptions make managing many isolated CD-ROM workstations complicated and expensive.

CD-ROM networks. - Libraries can save money by using CD-ROM networks. CD-ROM networks with multiple workstations share drives. Networked workstations share CD-ROM drives. Libraries can purchase CD-ROM subscriptions for numerous users. Although CD-ROM manufacturers charge more, multi-user network access costs less than many subscriptions. CD-ROM libraries are functional. It has been used in libraries since 1985. Library CD-ROM networking is functional. CD-ROM networks were very difficult to set up five years ago. Choose from a variety of well-functioning systems with varying features and performance. Like most technology, CD-ROM networks raise expectations. A strong network is always in demand. Library patrons will use the CD-ROM on business Computers because of its benefits. CD-ROM information services are available at campus libraries. Future access should be considered while designing a CD-ROM network for library patrons. Examine the interoperability of business or college network products.

Components of a CD-ROM Network

- *Microcomputer workstations.*
- *CD-ROM drives/optical server.*
- OPTI-NET Version 2.0 for MS-DOS
- CD Connection/CD Server
- CD Net Version 4.2
- *Network cabling.*
- *Network adapter cards.*
- *Network operating system.*
- SCSI Express
- Corel DRIVER Version 1.10

G. Electronic Publishing:

Electronic publishing refers to the creation, editing, distribution, and access of digital content such as digital libraries, online catalogues, e-books, and electronic journals. It involves preparing books, periodicals, and magazines for screen display on devices such as computers, e-readers, tablets, and smartphones.

Electronic scientific publishing is gradually transforming scholarly communication and may eventually reduce dependence on traditional print peer-reviewed journals. The rapid growth of platforms such as iTunes, Kindle, Google Play Books, and Apple Books has significantly expanded the digital publishing market. Market research indicates that digital formats may account for nearly 50% of magazine and newspaper circulation, demonstrating the increasing shift toward electronic media.

Non-network publications, such as CD/DVD encyclopedias and technical reference materials, are other examples of electronic publishing. In both established and emerging countries, digital publishing incorporates content and analytics, particularly for test preparation and educational products. Partnerships between digital platforms and major textbook publishers are driving the growth of electronic textbook development. Additionally, electronic fiction and academic information are rapidly being distributed via business and university networks.

Categories of Electronic Publishing

1. Electronic Versions of Traditional Media

- E-books
- Electronic journals
- Online magazines
- Online newspapers
- Online catalogues
- Online brochures
- Online newsletters
- Online presentations
- E-newspaper clippings
- CD-ROM publications
- Library news bulletins
- Online flyers and pamphlets
- PDF publications

2. New Media

- Blogs
- Collaborative software
- Digital publication apps
- Enhanced publications
- File sharing platforms
- Mobile applications
- Podcasts

3. Business Models in Electronic Publishing

- Digital distribution
- Online advertising
- Open access publishing
- Non-subsidy publishing
- Pay-per-view
- Print on demand

- Self-publishing
- Subscription-based models

Electronic publication has transformed the production, dissemination, and accessibility of information. It mixes classic publication forms, novel digital technology, and a variety of economic strategies. The proliferation of mobile devices, digital platforms, and open-access programs is reshaping the global publishing landscape, making content more accessible, interactive, and economically viable.

H. Communication Network Service:

Communication network facilities are the physical infrastructure and equipment utilized to transmit and provide communication services. These include any lines, cables, antennas, towers, gadgets, or other structures that aid communication networks.

Communication providers use this gear to offer services via both wireless and landline networks. Infrastructure often includes:

- Radio transceivers
- Antennas and towers
- Wires, coaxial cables, and fiber-optic cables.
- Network equipment and transmission devices.
- Regular and backup power supply systems.
- Small wireless facilities
- Associated structures or structural extensions that house equipment.

These facilities are the foundation of modern communication systems, providing dependable connectivity and data transmission independent of technical design.

Examples of Communication Network Services

- Internet services
- Email services
- Video and teleconferencing
- Teletext
- Video text

Overall, communication network facilities enable the seamless operation of digital communication services by enabling connectivity, information sharing, and real-time engagement across multiple platforms.

I. Bulletin Board Services:

A Bulletin Board System (BBS) is a computer server that connects users via terminal applications, typically over telephone lines and modems. Users may upload and download software and data, read news and bulletins, post on discussion boards, and communicate with other users.

Early BBSs were **text-based and ASCII-based**, though some systems expanded character sets to support enhanced colors and simple graphics. Different platforms used unique character standards such as **ATASCII (Atari)** and **PETSCII (Commodore)**. Later BBS versions incorporated Internet connectivity and telnet access.

Basic Requirements of a BBS

- A computer
- One or more modems
- One or more phone lines (more lines allow multiple simultaneous users)
- BBS software
- A system operator (SysOp)
- A user community

Key Features of Bulletin Board Services

BBS software typically provided:

- Menu-driven interface
- Message boards (message bases)
- File upload/download using protocols like **XMODEM, YMODEM, ZMODEM, and QWK**
- File libraries (file areas)
- Live monitoring of user activity by the SysOp
- Voting booths and opinion polls
- User statistics (top posters, uploaders, downloaders)
- Online games (single-player or limited multi-user)
- Access to third-party games (doorway games)
- Usage auditing and tracking
- Multi-user chat (on multi-line systems)
- Internet email (in later versions)
- Networked message boards
- Telnet access via Internet-connected servers
- "Yell for SysOp" feature for real-time chat with the system operator.
- Basic social networking features, such as user profiles and message posting

Overall, Bulletin Board Systems were early forms of online communities and social networks, playing a crucial role in the development of modern Internet forums, email systems, file-sharing platforms, and online communication services.

J. Online Discussion Boards and Forums

Online discussion boards are digital platforms where users can **post questions, share opinions, comment on issues, and engage in debates**. In educational settings, structured online discussions help students prepare for homework, tests, and classroom debates. When properly organized and actively managed, online forums enhance learning outside the classroom by fostering participation, critical thinking, and collaborative learning.

However, successful forums require active and consistent participation. Without leadership and participation, conversations may become inert. Well-structured forums organize postings by time or popularity, enabling long-term interactions.

Discussion boards are commonly utilized outside of schooling. They enable people with similar interests to exchange ideas, solve issues, share knowledge, and form communities. Many websites have forums where users, professionals, or volunteers answer inquiries, particularly about technical or specialized items.

Educational Benefits of Online Discussion Forums

- Promote discussion and critical thinking.
- Encourage active involvement.
- Promote collaborative learning.
- Extend learning outside classroom hours.
- Enhance communication and analytical abilities.

Examples of popular online discussion forums

- **Reddit** is a content-sharing and debate website divided into topic-specific "subreddits."
- **Stack Overflow** is a popular programming Q&A site where users earn reputation points.
- **Quora**- is a global question-and-answer platform with varied themes.
- **India Forums**- is a discussion forum for TV, Bollywood, sports, fashion, and more.
- **Yahoo Groups**- is a platform for topic-based group conversations (archived).
- **Google Answers**- a previous paid Q&A service (archive accessible).
- **Something Awful** is a humor-focused website with forums that impact internet culture.
- **Ask Ubuntu** is a technical Q&A forum for Ubuntu.
- **TripAdvisor** is a forum for sharing travel reviews and tips.
- **Experts-Exchange** is a subscription-based technical Q&A community.

Online discussion forums are effective venues for cooperation, information exchange, communication, and community development. These platforms, whether used for education, technical support, travel advice, or general-interest conversations, bring like-minded people together and encourage meaningful engagement and learning.

K. Online Reservation of Reading Material:

Online reservation systems are digital platforms that allow customers to view and manage reservations across a variety of locations, including restaurants, businesses, residences, and cars. Unlike traditional printed reservation registers, these solutions are available online and require internet access. They have a similar structure to electronic

books, with consecutive pages, but are primarily intended for booking management rather than interactive multimedia use.

In educational settings, online booking systems are often integrated with Virtual Learning Environments (VLEs) such as Moodle, where users can reserve resources, access content, and manage scheduled events. Online books are often used for commemorative or fundraising purposes, enabling greater audience interaction.

Overall, online reservation systems combine the simplicity of conventional record-keeping with the convenience and efficiency of digital technology.

Advantages of Online Reservation Books

- **Accessible:** Users may make and check bookings from any place with internet connectivity.
- **Reduced workload:** Automates booking procedures to save workload and staff time.
- **Faster Service:** Improved service by eliminating lengthy searches and manual record-checking.
- **Long-term data Management:** Reservation records may be retained, evaluated, and used for future planning to improve user services.

Finally, online reservation systems enhance convenience, efficiency, and service quality while allowing for greater data management and user interaction.

L. *Links to other Institutes' Library:*

Links to other institutes' libraries connect you to national and worldwide library associations, research groups, professional bodies, and collaborative platforms. These hyperlinks encourage openness.

Our goals include promoting OER, open access publication, sustainable scholarship, and cost-effective pedagogy, as well as fostering global library collaboration.

River Campus Libraries help instructors and students via open content initiatives, Open Scholarship LibGuides, and scholarship programs. These connections strengthen resource sharing, professional development, research visibility, and global networking.

Major Library Associations and Organizations

- **AASL (American Association of School Librarians)** – Links to state and regional school library organizations.
- **AALL (American Association of Law Librarians)** – Professional association for law librarians.
- **ALA (American Library Association)** – Includes directories of chapters, student chapters, research data, surveys, and statistics.
- **COSLA (Chief Officers of State Library Agencies)** – Represents state and territorial library agencies, offering research data and state library information.
- **IFLA (International Federation of Library Associations and Institutions)** – Global organization representing libraries in over 150 countries, promoting international cooperation.
- **IMLS (Institute of Museum and Library Services)** – U.S. federal agency supporting libraries and museums through funding and research.
- **Library of Congress** – U.S. national library providing research tools, digital collections, and reference services.

- **NISO (National Information Standards Organization)** – Develops technical standards for managing digital information.
- **OCLC (Online Computer Library Center)** – Provides global library services, research, and access tools such as WorldCat.
- **Schools and Libraries Program (E-Rate)** – Supports internet access for schools and libraries, especially in underserved areas.
- **Special Library Association (SLA)** – Supports librarians in corporate and specialized environments.
- **State Libraries (IMLS State Programs)** – Links to official state and territorial library agencies.
- **WebJunction** – An online community for library professionals offering learning resources and collaboration tools.
- **WorldCat** – A global catalog connecting users to over 10,000 libraries worldwide.

Overall Importance

Providing links to other institutes' libraries:

- Enhances global resource sharing
- Supports professional development
- Promotes open access and open scholarship
- Encourages collaboration among institutions
- Expands access to research, statistics, and technical standards

Overall, these links strengthen the academic and professional library network, improve information accessibility, and foster international cooperation in library and information services.

M. Links to Open Source Educational Sites:

From one place, you can search across many disciplines and *sources*: articles, theses, books, abstracts, and court opinions, from *academic* publishers, such as OER (Open educational resources). Not only save students from triple-digit (or more!) textbook costs, but they also allow instructors to mix-and-match content for a more personalized, engaging learning experience. Here are 16 resources that offer a wide range of content and tools to help implement OER in just about any course. Open educational resources are somewhat different from open learning in that they are primarily content, while open learning includes both content and educational services, such as specially designed online materials, in-built learner support, and assessment. Open educational resources cover a wide range of online formats, including online textbooks, video-recorded lectures, YouTube clips, web-based textual materials designed for independent study, animations and simulations, digital diagrams and graphics, some MOOCs, or even assessment materials such as tests with automated answers. OER can also include PowerPoint slides or PDF files of lecture notes. To be open educational resources, though, they must be freely available for at least educational use.

N. Inter Library Loan Facility (ILL):

"Interlibrary loan" (ILL), "inter lending," "document delivery," "document supply," or "interlibrary services" are all terms used to describe borrowing from libraries. Interlibrary borrowing allows one library to borrow and duplicate materials

from another. A library receives a user request, searches for libraries with the item, places the request, obtains it, gives it to the user, and arranges for its return. The interlibrary loan may incur fees. Lending libraries either provide or deplete. Regional library networks govern interlibrary lending and resource exchange. VDX on a computer automates procedures. The majority rely on ILL and the World share Management System. Interlibrary loans allow you to read articles from other libraries. Certain journal or database licenses permit interlibrary borrowing of journal articles. Ariel was developed by the Research Library Group (RLG) in the early 1990s to improve photocopying and native digital communication. Atlas Systems developed Odyssey in the early 2000s. Odyssey enables libraries to publish and report to their users. Articles are deleted from OCLC's cloud-based Article Exchange after multiple downloads and days.

O. Blog service:

Blogs encourage comments. Web apps can be published quickly or on a schedule. Anytime. It could be a person, a group, a business, a scenario, a tragedy, the environment, healthcare, or anything else. Blogs provide information to library visitors. It is accomplished by linking to the weblog or showing news on the homepage. Many blogs about library homepages. Employees with access to information can now blog. Libraries are "promoted" by them. Librarians blog for various reasons, including professional, general, and announcements. Blogs inform customers. Librarians use blogs for professional and general information and announcements. Libraries use blogs to creatively enlighten customers.

P. Plagiarism Service

The rapid growth of information technology and Internet access has significantly increased the availability of digital content. As a result, **plagiarism**—the act of using another person's words, ideas, or work without proper acknowledgment—has become a major academic and professional concern. Plagiarism is considered intellectual theft and is punishable under copyright law.

According to standard definitions (Merriam-Webster and Encyclopedia Britannica), plagiarism involves:

- Stealing and presenting another's ideas or words as one's own
- Using someone else's work without due attribution
- Committing literary theft
- Fraudulently presenting borrowed ideas as original.

Intent is generally irrelevant; the act itself constitutes misconduct.

Types of Plagiarism

Plagiarism is grouped into five major categories:

1. **Copy & Paste Plagiarism:** Directly copying text without citation.
2. **Word Switch Plagiarism:** Minor language alterations while maintaining original structure.
3. **Style Plagiarism:** Imitating the author's writing style.
4. **Metaphor Plagiarism:** Using unique metaphors or idioms without attribution.
5. **Idea Plagiarism** is presenting someone else's idea as one's own,

Need for plagiarism detection services.

Detecting and avoiding plagiarism in academic institutions is difficult owing to the widespread availability of internet resources. Students and researchers may reproduce information without proper reference. Thus, plagiarism detection software is crucial to:

- Discourage academic dishonesty
- Maintain research integrity
- Protect intellectual property and copyrights.
- Ensure originality in journals, conferences, and research publications.
- Identify unauthorized or illegal use of content.

Advanced detection tools are widely used by universities, research centers, publishers, and journalists to verify authenticity.

Methods of Plagiarism Detection

I. External Plagiarism Detection Methods

- Grammar-Based Detection
- Semantics-Based Detection
- Clustering-Based Detection
- Cross-Lingual Detection
- Citation-Based Detection
- Character-Based Detection

II. Intrinsic Plagiarism Detection Methods

- Grammar-Semantics Hybrid Detection
- Structure-Based Detection
- Syntax Similarity-Based Detection

Popular Online Plagiarism Checker Tools

- Turnitin
- Urkund
- Enago Plagiarism Checker
- Grammarly
- Duplichecker
- ProWritingAid

- Quetext
- Plagium
- Small SEO Tools
- Pre Post SEO
- PaperRater
- Edubirdie
- Search Engine Reports

Plagiarism-checking services are critical to ensuring academic integrity, research quality, and intellectual property rights. With the proliferation of digital information, the usage of plagiarism detection systems has become critical in educational institutions and professional publication settings to ensure originality and ethical writing practices.

4.3 Impact of Digital Resources and Services in Library Operations

The incorporation of digital resources has revolutionized library operations, including collection creation, cataloging, circulation, and user services. Libraries are increasingly using electronic resource management systems to manage licensing, access control, and use data.

To maintain dependability and relevance, digital services must be monitored and evaluated continuously. Librarians play an important role in maintaining these systems, negotiating licensing, and advising users on how to best use available resources.

Digital resources and services have profoundly impacted academic progress by enhancing access, collaboration, research, and teaching methods. Online journals, e-books, databases, and open-access repositories have expanded access to high-quality learning resources, enabling students and researchers to find information at any time and from any location. This has facilitated tailored learning while lowering geographical and economic obstacles.

Google Scholar, Zotero, Mendeley, and virtual communication platforms have all helped students, instructors, and researchers collaborate and communicate more effectively. They encourage interactive learning through conversations, video conferencing, and collaborative research projects.

Technology-driven platforms, including as simulations, gamified tools, and online examinations, promote active learning and give rapid feedback, hence increasing student engagement and academic achievement. Digital databases and citation tools improve research efficiency by reducing time and improving output.

Digital resources help promote inclusive and equitable education by meeting diverse learning needs through assistive technologies such as screen readers and subtitles. They also promote scientific innovation through open access, large-scale data sharing, and multidisciplinary cooperation.

The integration of modern technologies, such as artificial intelligence and data analytics, has led to the emergence of new digital skills and capabilities. Pedagogical techniques have moved toward blended learning, hybrid models, and flipped classrooms, improving the flexibility of teaching and learning.

Furthermore, digital resources are less expensive than printed materials, enabling institutions to expand educational delivery.

However, issues such as the digital divide, the quality control of online information, plagiarism, and ethical concerns must be addressed to ensure effective and responsible use.

Overall, digital resources benefit academic progress by increasing access to information, saving time, offering up-to-date content, archiving assets digitally, and improving the overall quality of research and instruction.

4.4 Advantages of Digital Resources and Services

Digital resources and services provide significant benefits over traditional print-based solutions. Consortia-based purchases have led to increased access to information, enhanced search capabilities, more efficient storage, and cost savings. Digital libraries also enable collaborative research and multidisciplinary learning.

Users benefit from the ease and flexibility of digital services, which enable autonomous, self-directed learning. For universities, digital resources improve research visibility and academic competitiveness.

4.5 Challenges and Limitations

Despite their benefits, digital resources and services pose certain obstacles. Technical challenges, license limitations, increased subscription rates, and reliance on suppliers can all impede access and sustainability. Furthermore, concerns about infrastructure and user skills affect equal access.

Libraries must also address issues such as data security, copyright compliance, and long-term digital preservation. These difficulties need strategic planning, policy support, and ongoing professional growth.

4.6 Role of Librarians in the Digital Environment

In the digital library environment, librarians' roles have grown beyond conventional tasks. Librarians today serve as information facilitators, digital resource administrators, and educators. They are responsible for teaching users, promoting information literacy, and facilitating research.

To successfully administer digital resources and services, librarians must possess professional abilities in ICT, digital content management, and user engagement. Continuous skill development is consequently crucial in the changing LIS context.

This chapter explored the concepts, kinds, and procedures associated with digital resources and services in academic libraries. It addressed both the benefits and drawbacks of digital library systems and the changing role of librarians in the digital era. The conceptual framework offered in this chapter serves as a basis for the methodological and analytical debates in the following chapters.

CHAPTER 5

RESEARCH METHODOLOGY

Introduction

Research methodology establishes a systematic framework for conducting academic inquiries while ensuring the validity and dependability of research findings. In library and information science evaluation studies, selecting an effective study design, data-gathering instruments, and analytical procedures is critical for providing meaningful insights. This chapter describes the research methodology employed in the current study, concentrating on the design, population, tools, and methodologies used to evaluate digital resources and services in the central libraries of Deemed Universities in Maharashtra.

In contrast to thesis-oriented methodological chapters that emphasize procedural detail, this chapter provides a succinct, reader-friendly summary of the research process, highlighting its rigor and relevance.

5.1 Research Design

The study used a descriptive and evaluative research approach. The descriptive technique was used to investigate the current state of digital resources, services, and infrastructure in the central libraries of designated institutions, while the evaluation component assessed their effectiveness, use, and impact on academic activities.

The mix of descriptive and evaluative methodologies allowed for a thorough examination of both library-level procedures and user experiences. This approach was deemed acceptable for studying usage patterns, levels of satisfaction, and issues related to digital library services.

5.2 Scope of the Study

The study focused on the central libraries of Deemed Universities in Maharashtra State. The analysis focused on the digital materials and services accessible in these libraries, as well as their administration and utilization by various user groups. The study included both institutional and user viewpoints, as represented by librarians, students, research scholars, and faculty members.

The subject scope includes the availability of digital resources, ICT infrastructure, digital services provided, user awareness, usage patterns, satisfaction levels, and perceived academic effect.

5.3 Population and Sample

The study population comprised all deemed universities in Maharashtra with functional central libraries offering digital resources and services. A purposive sampling technique was employed to select universities that met the criteria of offering recognized academic programs and maintaining digital library facilities.

Two major respondent groups were identified for data collection: library professionals working in the central libraries and users of digital resources, including students, research scholars, and faculty members. This dual-perspective approach enabled a holistic evaluation of digital resources and services.

The population and the sample are the same: 21 central libraries of the deemed universities. From 21 deemed university libraries, 20 librarians have responded to the survey, and data analysis is presented based on the collected data from the 20 responding libraries. The response to the librarian's survey is 95.23%. Regarding the user population and sampling, the researcher has selected the user category of postgraduate students and researchers from all departments of the university.

Thus, for the 25076 population of P.G. students, researchers/Faculties, the sample selected for the survey is 1050; the researcher has distributed questionnaires randomly to users who are actually present in the libraries. The researcher collected data from users and librarians through personal visits to the deemed university libraries; approximately 50 users from each university responded. The response rate from users is 850 students and researchers, or 81%. The Population and sample are detailed in the table given below.

Table 5.1: Population and sample of the study

Deemed Universities	Deemed Universities	Questionnaire Distributed	Overall	Response Received	Overall Response Received
Deemed University Librarians	Deemed University Librarians	21		20	20 (95%)
Deemed University Library Users	Research Scholar	385 (37%)	1050	256 (66%)	850 (81%)
Deemed University Library Users	P.G. Student	665 (63%)	1050	594 (89%)	850 (81%)

5.4 Data Collection Tools

Primary data for the study were collected using structured questionnaires designed separately for librarians and users. The questionnaires included both closed-ended and open-ended questions to capture quantitative data and qualitative insights.

The **librarian questionnaire** focused on infrastructure, digital collections, services, management practices, and challenges. The user questionnaire asked about awareness, frequency of usage, purpose of use, satisfaction levels, and challenges encountered when utilizing digital resources.

Secondary data were gathered from institutional papers, library websites, annual reports, policy documents, and relevant published literature to augment primary data and offer context.

5.5 Data Collection Procedure

Data were gathered by human visits, email correspondence, and online surveys, depending on institutional accessibility and respondent convenience. Respondents were given adequate time to offer meaningful and truthful replies.

Ethical factors, such as informed consent and confidentiality, were upheld throughout the data-gathering procedure. Participation in the survey was entirely voluntary, and responses were used solely for academic and research purposes.

Out of 21 questionnaires provided to university librarians, 20 (95%) completed the survey. 1050 (100%) questionnaires were issued to users; 850 (81%) responded, with 256 (30%) Research Scholars and 594 (70%) P.G. Students selected from all 20 universities.

5.6 Data Analysis Techniques

The collected data were properly structured, processed, and analyzed using acceptable statistical methods. The data was summarized and interpreted using descriptive statistics, including frequencies, percentages, and averages. Tabular and graphical representations were used to improve clarity and readability.

Thematic analysis of qualitative responses revealed recurring themes, perspectives, and issues related to digital resources and services. The merging of quantitative and qualitative analysis increased the study's interpretive depth.

The primary data acquired via the questionnaire were coded and tabulated using the statistical software I.B.M. Statistical Package for Social Sciences (SPSS). V 25. The total data analysis was likewise conducted in Microsoft Excel, with assistance from a statistical specialist.

5.7 Limitations of the Study

As with any empirical inquiry, the current study has several limitations. The conclusions are based on responses from selected universities in Maharashtra and may therefore not be immediately applicable to other locations or types of higher education institutions. Variations in infrastructure, financing, and institutional priorities may affect the application.

Furthermore, the study relied on self-reported data, which is susceptible to respondent bias. Despite these limitations, the survey provides useful information about the state and use of digital resources and services in designated university libraries.

This study's shortcomings stemmed mostly from the nature and extent of the data obtained.

The study focused primarily on three perspectives: users, librarians, and digital resources and services, which may have hampered a more comprehensive knowledge of other influential aspects.

The research did not thoroughly examine use disparities across different user groups or categories. Furthermore, no age-based analysis was performed because the majority of the participants were young university students. Gender-based analysis was also ruled out because the majority of responders were men.

These limitations imply that the findings may not adequately reflect varied demographic groups, limiting the generalizability of the outcomes.

This chapter discussed the study's research methodology, including the research design, scope, population, data-gathering instruments, and analytical methods. The methodological approach allowed for a comprehensive and impartial evaluation of digital resources and services from both institutional and user perspectives. The findings from this technique are given and examined in the following chapters.

CHAPTER 6

DATA ANALYSIS

DIGITAL RESOURCES AND SERVICES: LIBRARIANS PERSPECTIVES

Introduction

This chapter analyses data from librarians working in the central libraries of Maharashtra's deemed University, with an emphasis on infrastructure, digital collections, services, management practices, and challenges. And the user's perspectives regarding Digital Resources & Services provided by the Central libraries of Deemed University in Maharashtra State.

This chapter evaluates digital resources and services in the central libraries of deemed universities in Maharashtra from both institutional and user perspectives. It analyzes data collected from librarians regarding infrastructure, digital collections, management practices, services, and challenges in developing and delivering electronic resources. Librarians play a key role in ensuring that digital resources effectively support academic and research activities.

In addition, the chapter examines user interactions with digital materials, focusing on awareness levels, usage patterns, satisfaction, and perceived academic impact. By incorporating user feedback, the study complements the institutional evaluation and provides a comprehensive understanding of the effectiveness, strengths, and limitations of digital library services.

6.1 Profile of Library Professionals

Librarians' professional backgrounds affect the quality and effectiveness of digital library services. According to the data, the majority of librarians hold professional qualifications in Library and Information Science and have varying levels of experience working in university libraries. Many responders got training in library automation, electronic resource management, and information technology.

Continuous professional development has emerged as a crucial aspect of managing digital resources, as librarians must adapt to rapidly changing technology and user expectations.

6.2 ICT Infrastructure in Central Libraries of Deemed University

ICT infrastructure is a major factor influencing the efficacy of digital library services. According to the research, the majority of the universities' central libraries regarded as central libraries include basic ICT amenities such as networked PCs, internet access, and integrated library management systems. Automation of library operations has resulted in more efficient collection management and easier access to information.

However, there were differences in the quality and capability of infrastructure amongst institutions. Differences in bandwidth availability, system updates, and technical support all affect the dependability and performance of digital services.

6.3 Availability of Digital Resources

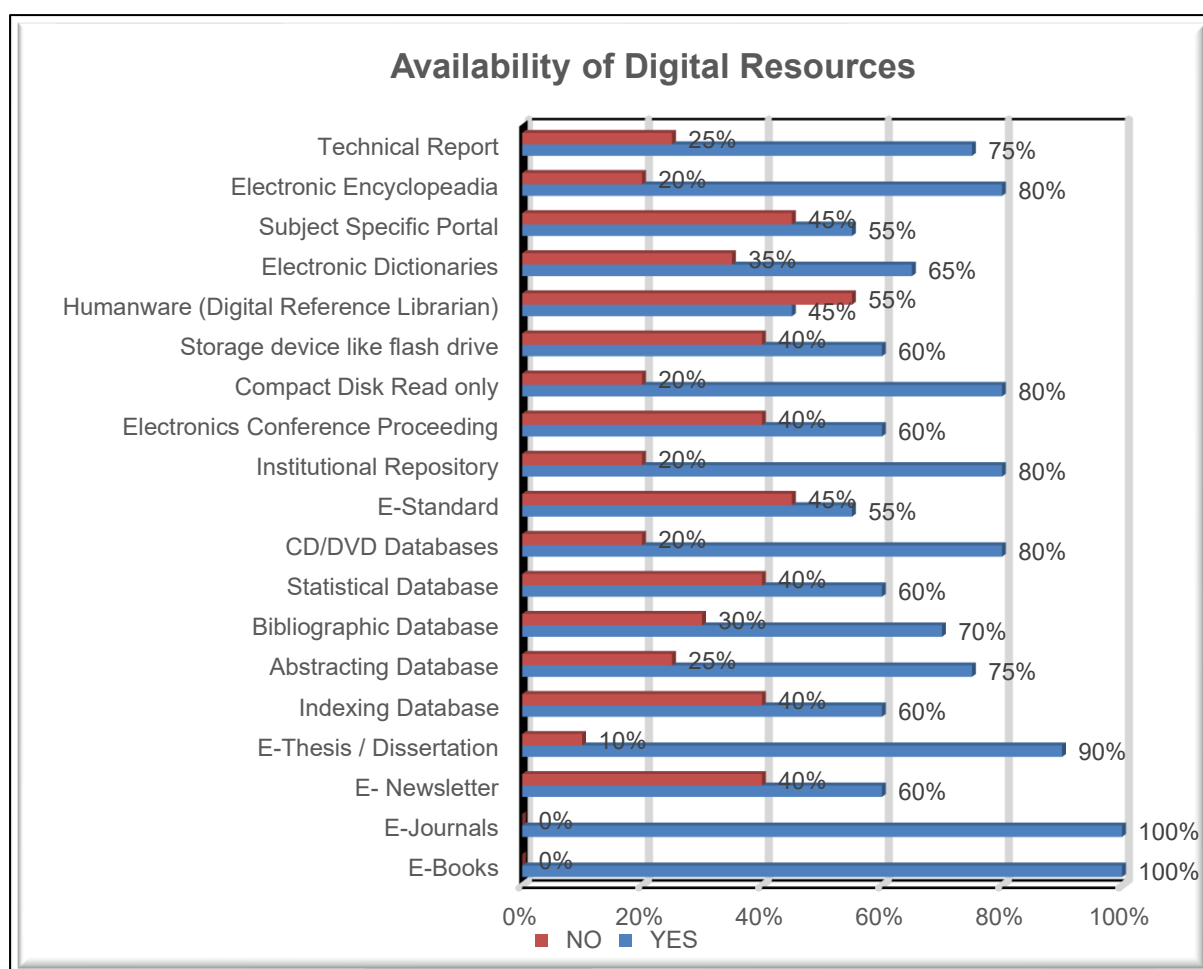


Figure 6.1: Availability of Digital Resources

Figure 6.1 presents the availability and quantity of digital resources in the Central Libraries of 20 Deemed Universities. The findings show that **e-books and e-journals are universally available (100%)**, making them the most widely accessible digital resources. However, there is considerable variation in their quantity across universities, with some institutions holding large collections (over 5000 e-books or 1000+ e-journals), while others maintain moderate or smaller collections.

Other digital resources such as **e-databases, CD/DVD databases, electronic reference materials, technical reports, and institutional repositories** are available in a majority of universities (60%–90%), though most institutions hold resources in the range of 1–99 items. Institutional repositories (80%) and e-theses/dissertations (90%) indicate a strong focus on research preservation and digital archiving.

In contrast, **e-newsletters, subject-specific portals, storage devices, and digital reference librarians (humanware)** are less commonly available, with limited quantities in most institutions.

Overall, the table highlights strong adoption of core digital resources (e-books and e-journals), moderate availability of research-oriented resources, and comparatively lower emphasis on support services and specialized digital tools across the deemed university libraries.

The availability of digital materials is a major measure of a library's ability to support academic and research activity. The findings reveal that libraries subscribe to a wide range of electronic journals, e-books, and online databases spanning a variety of fields. Access to national consortium-based resources has greatly expanded the scope of digital collections.

Academic programs, research interests, and economic constraints are among the factors librarians consider when selecting subscriptions. While essential resources are typically fully covered, specific topic areas may be limited by financial constraints.

6.4 Availability and Awareness of Library Consortium

Table 6.1: Use of Library Consortia and Collaborative Initiatives

INFLIBNET Programs & Activities	Responses		Percent of Cases
	Membership	Percent	
N-LIST	6	10%	35%
E-Shodhsindhu	9	14%	52%
Shodhshuddhi	4	6%	23%
VIDWAN	5	8%	29%
CALIBER – A National Convention	2	3%	11%
INFOPORT	7	12%	41%
Shodhganga	13	21%	77%
Research Projects Database	9	14%	52%
PLANNER – A National Convention for North Eastern Region	2	3%	11%
HRD-ICT Skill Development Programs	2	3%	11%
SHODH- Charka	2	3%	11%
Indcat – Union Catalogue of Indian Universities	2	3%	11%

Table 6.1 shows that **17 libraries (85%)** are members of various INFLIBNET Centre programmes. Among these, **Shodhganga (77%)** has the highest participation, making it the most widely used programme. This is followed by **E-Shodhsindhu (52%)** and the **Research Projects Database (52%)**, indicating strong engagement in research-oriented digital services.

Moderate participation is seen in **INFOPORT (41%)**, **N-LIST (35%)**, and **VIDWAN (29%)**, while **Shodhshuddhi (23%)** has comparatively lower membership.

Programmes such as **CALIBER**, **PLANNER**, **HRD-ICT Skill Development**, **SHODH-Charka**, and **IndCat** show minimal participation (11% each).

Overall, the findings highlight that Shodhganga is the most prominent INFLIBNET programme, followed by E-Shodhsindhu and the Research Projects Database, while several other programmes record limited participation among member libraries.

Membership in programmes other than INFLIBNET is an important aspect of university libraries. The findings show that **50% of libraries are members of the INDEST Consortium**, making it the most preferred programme. Additionally, **35% of libraries are affiliated with other consortia**, indicating diversity in consortium participation. Only **10% are members of the CSIR Consortium**, making it the least represented.

Overall, the data highlights that the majority of libraries prefer the INDEST Consortium, followed by other consortium memberships, while CSIR membership remains comparatively limited.

Participation in library consortia has evolved as a strategic tool for resource acquisition. Most libraries said they actively use national consortia, such as e-ShodhSindhu, which provide low-cost access to high-quality academic literature.

Consortia-based access has increased fairness in resource availability and enabled libraries to offer a broader selection of digital materials than would otherwise be available. Librarians recognized the value of joint efforts to maintain digital collections amid escalating subscription prices.

6.5 Digital Library Services Offered

Central libraries provide a wide range of digital services to help students access electronic materials and assist their academic pursuits. Online public access catalogs, remote access facilities, electronic reference services, and institutional repository access are among the most commonly reported services.

Librarians noted the growing importance of research support services, such as plagiarism detection, citation assistance, and support for research dissemination. These services help to improve research quality and institutional visibility.

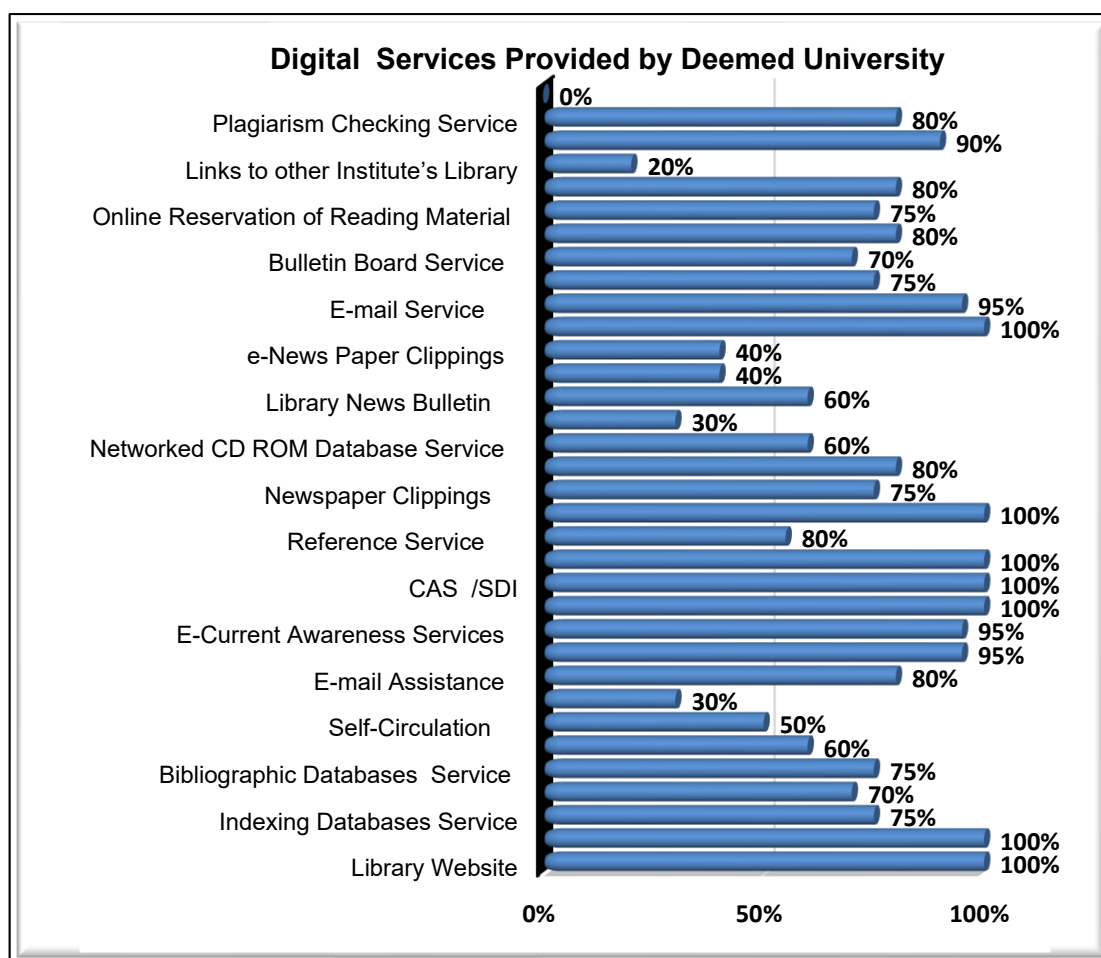


Figure 6.2: Digital Services Provided by Deemed University

Interpretation: Figure 6.2 reveals that Deemed University libraries in Maharashtra widely provide digital library services. **Library Website and Web OPAC are universally available (100%)**, serving as essential tools for accessing library resources.

Most libraries (75%) provide databases such as indexing, abstracting, bibliographic, and statistical databases, though statistical databases show slightly lower availability (60%). Institutional repositories, current content services, and alert services also record **100% usage**, while new arrivals (95%) and newspaper clippings (75%) are well utilized.

Communication services like Internet (100%) and e-mail (95%) are almost universally available. Inter Library Loan (ILL) is highly used (90%), and services like video conferencing and plagiarism checking show strong engagement (75–80%). However, self-circulation (50%), virtual reference (30%), e-newsletters (40%), links to other libraries (20%), and blogs (0%) have comparatively lower usage.

Overall, the libraries offer a comprehensive range of digital services with strong adoption of core access, research, and communication tools, while certain interactive and promotional services show limited engagement and scope for improvement.

6.6 Promotional and User Support Activities

Promoting digital resources and services is critical to their effective use. The investigation shows that libraries use a variety of tactics to raise awareness, including orientation programs, seminars, training sessions, and library websites. Despite these efforts, librarians observed that user awareness is inconsistent, particularly among new students and undergraduates. Regular, focused user involvement was highlighted as an important way to increase utilization.

6.7 Management Practices and Policy Support

To effectively manage digital resources, clear policies, enough financing, and administrative assistance are required. Librarians noted that institutional policies usually encourage the use of digital resources and services, while decision-making procedures differ among universities. Budgeting, licensing, and vendor management challenges were identified. Librarians emphasized the importance of long-term planning and sustained funding for digital library initiatives.

6.8 Challenges for Librarians

Librarians highlighted many issues with the administration of digital resources and services. These include escalating subscription fees, technical obsolescence, limited staffing, and the requirement for ongoing training. Access disruptions and system maintenance are examples of technical issues that affect service delivery.

User problems, such as limited awareness and varying levels of digital literacy, hamper effective resource use. Addressing these difficulties necessitates collaborative efforts at the institutional and policy levels.

This study examined digital resources and services from the librarian's perspective, emphasizing the state of infrastructure, resource availability, services provided, and management issues. The findings reflect both advances and challenges in establishing digital library environments at Maharashtra's Deemed Universities. These institutional insights form the foundation for understanding user experiences and perspectives, which are explored in the next chapter.

6.9 User's Perspectives - Behaviour, Satisfaction, and Academic Impact of Digital Resources

While institutional infrastructure and services are the foundation of digital libraries, their ultimate success depends on how well users interact with and benefit from digital materials. Understanding user behavior, levels of awareness, usage patterns, and satisfaction is critical for assessing the impact of digital library services. This chapter examines data from users of central libraries in Maharashtra's Deemed Universities, with an emphasis on their interactions with digital resources and services and their perceived academic impact.

The study incorporates user feedback and supplements the librarian-centric evaluation offered in the preceding chapter.

6.10 Profile of Library Users

The study's user population consists of undergraduate and postgraduate students, research scholars, and faculty members from several academic fields. This diversity reflects the diverse nature of considered institutions, as well as the broad range of information demands met by their central libraries.

Academic positions shape the intensity and purpose of digital resource utilization. Research scholars and faculty members make more frequent and advanced use of digital resources, whereas students primarily utilize them to supplement coursework and learning activities.

6.11 Awareness & Uses of Digital Resources and Services

User awareness is a significant aspect influencing the use of digital resources. The findings show that the majority of users are aware of the availability of fundamental digital resources, such as electronic journals and online databases. However, knowledge levels differ for specialist resources, institutional repositories, and advanced digital services.

Orientation sessions, library websites, and teacher mentoring were regarded as key sources of information. Despite these techniques, a subset of users reported having little understanding of the full range of digital resources available to them, indicating the need for more systematic promotional efforts.

The research of usage patterns shows that the majority of respondents utilize digital resources on a regular basis. Electronic journals and online databases are the most popular resources, followed by e-books and open-access materials. Users often use digital resources to prepare assignments, conduct literature reviews, write research papers, and update their knowledge of the topic. Remote access capabilities have greatly expanded usage by allowing access beyond the library's grounds.

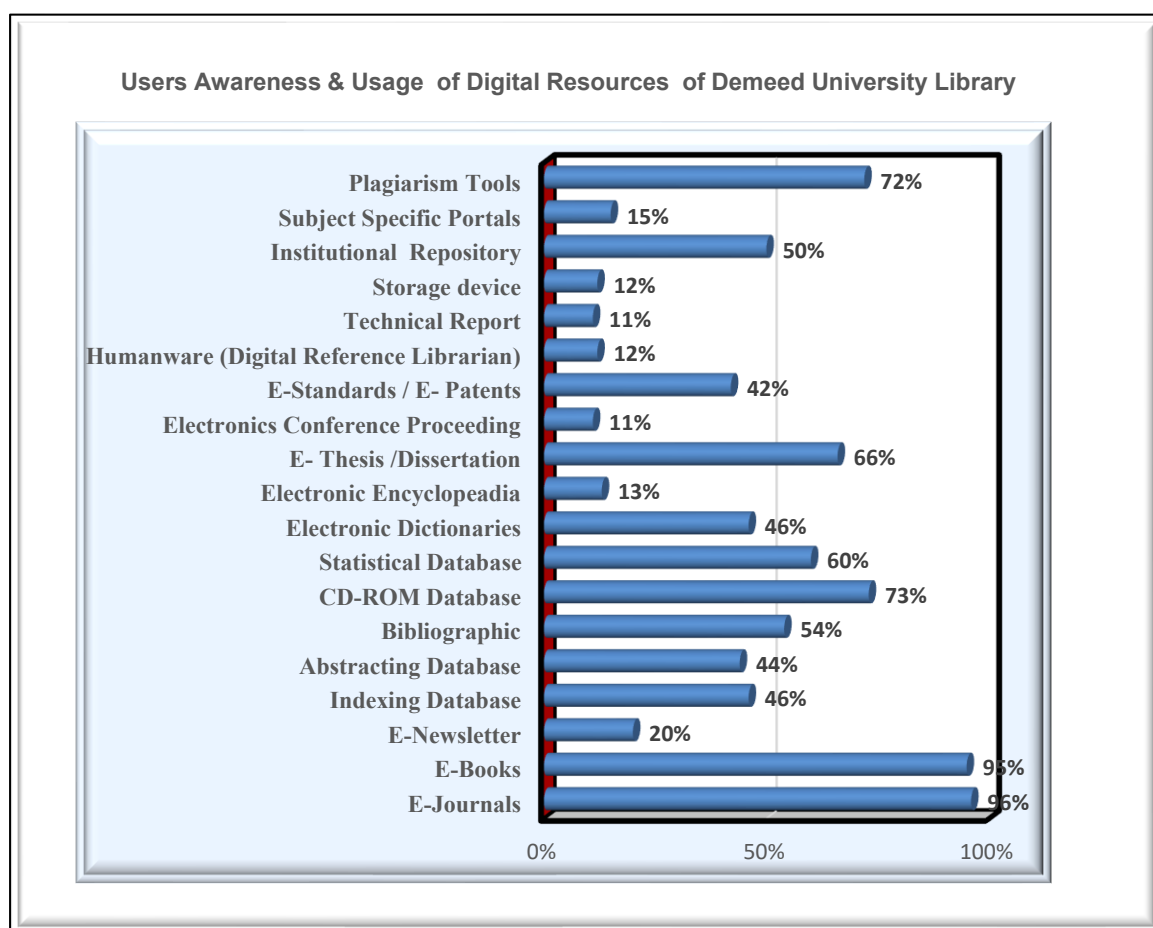


Figure 6.3: Users Awareness & Usage of Digital Resources of Deemed University Library

Interpretation:

Figure 6.3 highlights users' awareness and usage of digital resources in the Central Libraries of Deemed Universities. The findings reveal very high awareness of **E-Journals (96%)** and **E-Books (95%)**, making them the most widely recognized and used digital resources. Plagiarism detection tools (72%) and CD-ROM databases (73%) also show strong awareness.

Moderate awareness is observed for E-Theses/Dissertations (66%), Statistical Databases (60%), Bibliographic Databases (54%), Institutional Repositories (50%), and Indexing/Abstracting Databases (44–46%).

However, several specialized resources show low awareness, including Electronic Encyclopaedias (13%), Electronic Conference Proceedings (11%), Technical Reports (11%), Humanware/Digital Reference Librarian (12%), Storage Devices (12%), and Subject-Specific Portals (15%). E-Newsletters also have limited recognition (20%).

Overall, the data indicates that core online academic resources such as e-journals and e-books are highly integrated and widely used, while specialized and support-oriented digital services have comparatively lower awareness among users.

6.12 Purpose of Using Digital Resources

The primary purposes for using digital resources include academic Learning, research, classroom preparation, and exam-related tasks. Students typically use digital resources to supplement their coursework and exams, whereas researchers and faculty members concentrate on research, publishing, and curriculum development.

The findings indicate that digital resources are critical in supporting both teaching and research roles at designated institutions.

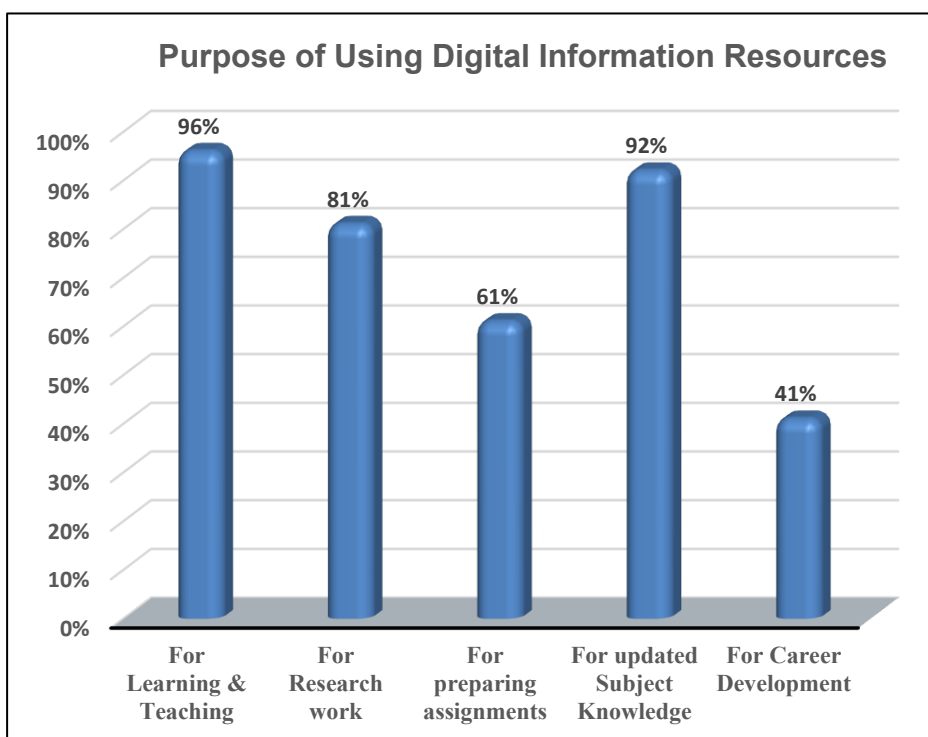


Figure 6.4: Purpose of using Digital Information Resources

Interpretation:

Figure 6.4 presents the purposes for which 850 users utilize digital information resources. The primary purpose is **learning and teaching (96%)**, indicating the central role of digital resources in academic activities. A large proportion of users also rely on them for **updated subject knowledge (92%)** and **research work (81%)**, reflecting their strong importance in academic and professional development.

Additionally, **61%** of users use digital resources for preparing assignments, showing their relevance in coursework support. **Career development (41%)** is comparatively a secondary purpose, though still significant. Overall, the findings highlight that digital resources are mainly used for educational and research activities, while also contributing to academic growth and professional advancement.

6.13 Satisfaction with Digital Resources and Services

User happiness is an important measure of service performance. The findings show that most users are moderately to very satisfied with the availability and accessibility of digital resources. Users like the ease, speed, and depth of information provided by electronic resources.

However, levels of satisfaction vary based on criteria such as ease of access, internet connectivity quality, and resource availability. Access limitations and restricted coverage in specific topic areas affect user satisfaction.

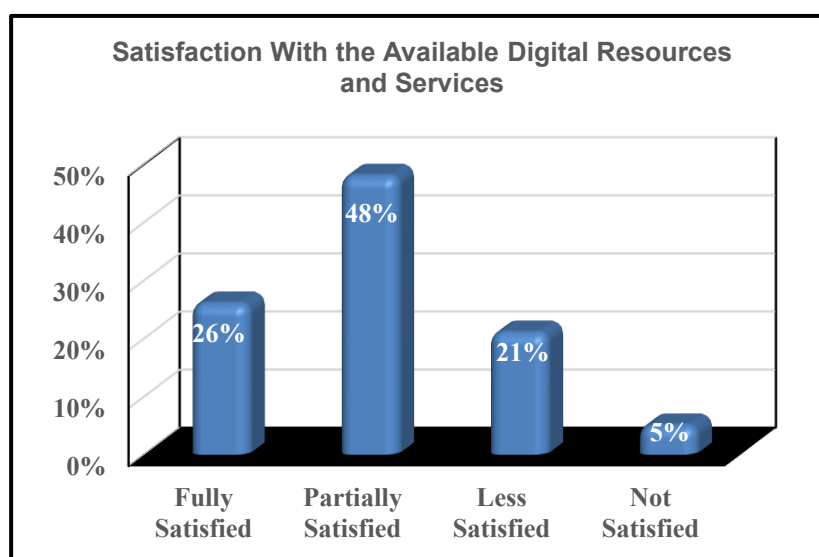


Figure 6.5: Satisfaction with The Available Digital Resources and Services

Interpretation:

In this study, it is observed that: **Figure 6.5** presents the satisfaction levels of 850 users regarding digital information resources and services. The findings show that **48% of users are partially satisfied** and **26% are fully satisfied**, indicating that a majority (74%) express overall satisfaction with digital services.

However, **21% of users are less satisfied** and **5% are not satisfied**, together accounting for 26% dissatisfaction. The mean score of 3.46 and a standard deviation of 0.854 suggest moderate variation in satisfaction levels among users.

Overall, the results indicate that most users are satisfied with digital resources and services, though there remains scope for improvement to address the concerns of the dissatisfied group.

This suggests that the vast majority of users have a good opinion of digital resource offerings, yet a sizable minority expresses discontent, indicating a need for future improvement.

6.14 Problems Faced by Users

Despite generally good opinions, users noted significant issues with accessing and using digital materials. Slow internet connectivity, difficulty with remote access authentication, limited search skills, and a lack of knowledge of sophisticated capabilities are common challenges.

Some users have mentioned issues with information overload and difficulties recognizing relevant and reliable sources. These findings underline the importance of ongoing user assistance and information literacy activities.

Several key problems in obtaining digital materials were recognized across all respondents:

- **88%** reported **slow Internet speed** as the most significant problem.
- **85%** indicated **insufficient terminals/workstations** as a major issue.
- **76%** faced the problem of the **unavailability of the latest computers**.
- **69%** reported **non-availability of full-text access to most journals**.
- **60%** stated that the **lack of training/orientation** hindered the effective use of digital resources.
- **43%** experienced an **electricity failure** while accessing digital resources.

The findings clearly indicate that **infrastructure-related issues**—particularly slow internet speed and insufficient terminals—are the most critical barriers to effective access. Additionally, outdated Hardware, restricted full-text journal access, and insufficient user training all diminish the productivity of digital services.

Improving internet connectivity, increasing the number of workstations, upgrading systems, ensuring a consistent power supply, expanding full-text journal access, and providing adequate training/orientation programs would significantly improve user satisfaction and overall effectiveness of digital resource services.

6.15 Academic Impact of Digital Resources

The perceived academic impact of digital materials is generally good. Users noted that having access to digital resources improved the quality of their assignments, increased research output, and facilitated autonomous study. Researchers and faculty members reported advances in literature review procedures, citation practices, and publishing activities.

Digital resources were also shown to promote interdisciplinary learning and exposure to worldwide research trends, thereby supporting overall academic growth.

Users' perception of the impact of digital resources and services on their academic development.

The findings show that consumers generally have a positive opinion of digital resources and services, with varying degrees of agreement and response consistency across elements.

6.15.1 Subject-Specific Information:

The majority (63%) of respondents agree that they obtain subject-specific information. The mean score of 2.88 indicates that responses range between "Somewhat Agree" and "Agree." The standard deviation (0.582) and coefficient of variation (0.338) demonstrate minimal variability, indicating that people's opinions are stable.

6.15.2 Ease and Speed of Access:

About **52% somewhat agree** that searching and accessing Information is more accessible and faster. The mean of 3.97 represents a good score near "Agree." The S.D. (0.85) and C.V. (0.723) indicate substantial variability, showing diverse levels of agreement across users.

6.15.3 Time Saving:

Information is now more easily available and quicker. The mean of 3.97 represents a strong score close to "Agree." The S.D. (0.85) and C.V. (0.723) indicate significant variability, suggesting varying degrees of agreement across users.

6.15.4 Current and Up-to-Date Information:

The majority of respondents agree that they obtain updated information (45% somewhat agree, 27% definitely agree). The mean score of 4.44 indicates a generally good response. Responses vary somewhat (S.D. = 0.851; C.V. = 0.723).

6.15.5 Comfort in Accessing Digital Resources:

A majority (52%) said they feel comfortable using digital materials. The mean of 3.55 reflects a cheerful attitude; however, it is not overly strong. The S.D. (0.577) and C.V. (0.333) show minimal variability, indicating consistent satisfaction levels.

6.15.6 Improvement in Study/Research Quality:

Approximately 45% strongly believe that digital resources increase the quality of study or research. The mean score of 3.60 shows significant favorable agreement. Although the standard deviation is not supplied, the C.V. indicates considerable variability in answers.

6.15.7 Sufficiency of Resources:

A significant 54% believe that the library's digital resources in their subject area are adequate. The S.D. (0.496) and C.V. (0.246) demonstrate minimal variability, indicating widespread agreement across users.

Users generally evaluate digital resources and services positively. Most responders recognize their value in delivering subject-specific, updated, and time-saving information. However, substantial heterogeneity across several areas—particularly ease of access, time-saving benefits, and resource sufficiency—indicates room for improvement in user experience and service delivery.

6.15.8 User Expectations and Suggestions

Users indicated a need for better access, expanded resource coverage, and more user-friendly services. Suggestions included boosting subscriptions to subject-specific databases, strengthening internet infrastructure, and providing ongoing training sessions.

These user expectations offer useful direction to library managers and lawmakers looking to improve digital library services.

6.16 User Suggestions for Improvement of Library Digital Resources and Services (N = 850)

- The results demonstrate a considerable user interest in improving infrastructure, awareness, accessibility, and resource sharing. • Improved internet speed (95%).
- Improving internet speed is the most popular solution, with 810 responders (95%) highlighting the need of robust and dependable access.
- **Displaying information about digital resources (89%)**
- **760 people (89%)** recommended prominently posting information about digital resources on each library floor to increase awareness and accessibility.
- 88% of respondents (750) suggested increasing the frequency of user orientation and staff training sessions to promote awareness and effective use of digital resources.
- 6% of 650 users urged increasing the usability of digital platforms and services.
- increase in updated PCs. - 50 responders (65%) suggested increasing the quantity of updated computers to improve accessibility. 53% of 450 users urged university libraries to exchange digital content to improve accessibility and cooperation.
- 47% of 400 respondents stressed the significance of preserving and digitizing rare materials.

The findings show that customers mostly want improvements in technical infrastructure (internet speed and updated systems) and awareness activities (orientation programs and information display). Furthermore, there is a strong interest in improving usability, digitization, and inter-library exchange of digital materials.

This chapter investigated user behavior, awareness, usage patterns, satisfaction levels, and the perceived academic impact of digital resources and services in the deemed university libraries of Maharashtra. The findings show that digital tools serve an important role in supporting academic activities, while also highlighting opportunities for development. The insights collected from user views inform the synthesis of findings and suggestions shown in the following chapter.

CHAPTER 7

KEY FINDINGS, IMPLICATIONS, AND BEST PRACTICES

Introduction

The previous chapters provided a thorough review of digital resources and services in the central libraries of Maharashtra's Deemed Universities, from both institutional and user viewpoints. This chapter summarizes the study's primary results and explores the consequences for library professionals, university administrators, and lawmakers. It also includes recommended practices for improving digital library services and their academic effect.

By combining information from librarian responses and user experiences, this chapter provides a comprehensive picture of the efficacy, challenges, and future potential of digital resources and services in university libraries.

7.1 Summary of Key Findings

The survey found that central libraries at Maharashtra's deemed universities have made substantial progress in creating digital infrastructure and resources. Most libraries have basic ICT infrastructure and offer access to a variety of electronic periodicals, e-books, and online databases. Participation in national consortia, such as e-ShodhSindhu, has significantly increased the variety and quality of digital materials available to consumers.

From the standpoint of librarians, digital library services have grown beyond traditional functions to include remote access, electronic reference services, institutional repositories, and research help. Librarians displayed an awareness of evolving responsibilities and recognized the need for ongoing professional development in managing digital settings.

User-related studies show that digital resources are commonly used for academic learning and research. Electronic journals and databases emerged as the most popular resources. Users reported moderate to high levels of satisfaction with digital resources and services, particularly their convenience and accessibility.

Despite these great achievements, the study found many obstacles. Variations in ICT infrastructure, economic constraints, a lack of awareness of specialist resources, and disparities in information literacy all affect optimal use. Technical concerns and access constraints affect user satisfaction.

7.2 Implications for Library Professionals

The findings underscore the evolving role of library professionals in digital learning environments. Librarians are increasingly expected to support digital learning and research, rather than simply perform traditional custodial duties. Competencies in electronic resource management, information literacy instruction, and user engagement are essential.

Librarians must participate in ongoing training and skill development programs in order to effectively manage complex digital systems and respond to user demands. Librarians must also take an active role in promoting digital resources and assisting users with proper information utilization.

7.3 Implications for University Administration

University administrators have a crucial role in influencing the effectiveness of digital library services by setting policies and allocating resources. The research underlines the need to make constant financial investments in digital resources, ICT infrastructure, and human capital.

Administrative support for library-led initiatives such as institutional repositories, research support services, and information literacy programs can significantly boost academic achievement. Integrating library services into institutional academic planning is crucial for maximizing the return on digital resources.

7.4 Policy Implications

To counteract growing subscription fees, policymakers should boost collaborative initiatives and consortium-based access arrangements. Policymakers should consider region-specific measures to accommodate institutional diversity and varying levels of digital preparedness.

Support for open-access efforts and national digital library projects can help ensure fair access to intellectual knowledge. Policies that promote information literacy and digital skills development are also essential for ensuring the efficient use of digital resources.

7.5 Best Practices for Digital Library Development

Based on the study's findings, many recommended practices are identified for improving digital resources and services at declared university libraries:

- Strategic planning for digital collection development is aligned with academic and research priorities.
- Regular evaluation of digital resources based on usage and user feedback
- Strengthening ICT infrastructure to ensure reliable and seamless access
- Continuous professional development for library staff in digital competencies
- Systematic promotion of digital resources through orientation and training programs
- Integration of information literacy initiatives into academic curricula
- Development and maintenance of institutional repositories to enhance research visibility

Adopting these best practices can help to create more successful and sustainable digital library services.

7.6 Contribution of the Study

This work contributes to the field of Library and Information Science by conducting an empirical evaluation of digital resources and services in university libraries, which is a relatively under-researched topic. By merging institutional and user perspectives, the study provides a comprehensive overview of digital library settings in Maharashtra. The findings contribute to current research on digital library assessment while also providing practical insights to guide higher education library policy and practice.

This chapter summarizes the study's primary results and examines the implications for library professionals, university administrators, and lawmakers. It also suggested best practices for improving digital library services at designated universities. The last chapter summarizes the general findings, suggestions, and directions for further study.

CHAPTER 8

CONCLUSION, RECOMMENDATIONS, AND FUTURE DIRECTIONS

Introduction

Academic libraries' transition into digital information hubs has had a substantial impact on teaching, learning, and research activities in higher education institutions. This thesis investigated the availability, use, and impact of digital resources and services in central libraries in deemed Universities in Maharashtra. Using a systematic, evaluative approach, the study explored both institutional practices and user experiences, offering a comprehensive understanding of digital library environments in this regional context.

This final chapter summarizes the study's main results, offers critical suggestions, and proposes areas for future research.

8.1 Overall Conclusions of the Study

The report reveals that deemed university libraries in Maharashtra have made significant progress in implementing digital resources and services. Most libraries have shifted from conventional print-centric models to hybrid and digital systems, aided by ICT infrastructure and national efforts. Access to electronic journals, databases, and e-books has become an essential part of academic and research work.

Remote access, online catalogues, electronic reference services, and institutional repositories are examples of digital library services that improve access to and the usability of information resources. The findings demonstrate that digital tools benefit academic growth by facilitating autonomous learning, enhancing research quality, and increasing scholarly output.

However, the study also found that the efficiency of digital tools and services varies per institution. Variations in infrastructure quality, fiscal support, and personnel capacity affect service delivery and satisfaction. While essential digital resources are well known and widely used, some user groups continue to under utilize specialized resources and sophisticated services.

8.2 Major Contributions of the Monograph

This monograph provides significant contributions to the discipline of Library and Information Science. It conducts an empirical study of digital resources and services in designated university libraries, a subject that has received little academic attention. By combining librarian and user viewpoints, the study provides a comprehensive assessment of digital library practices.

The regional focus on Maharashtra adds a contextual dimension to the previous literature while also highlighting institutional variety within the deemed university system. The findings help to advance both theoretical knowledge and practical decision-making in the field of digital library creation and administration.

8.3 Recommendations for Library Practice

Based on the study's findings, the following recommendations are made to improve digital resources and services at declared university libraries:

- Create digital collection development policies that match academic and research agendas.
- Improve ICT infrastructure for dependable and fast access to digital materials.

- Expand digital resource subscriptions to meet user demands, including subject-specific and transdisciplinary content.
- Encourage ongoing professional development programs for library workers, focused on digital capabilities.
- Increase user awareness through frequent orientation events, workshops, and online tutorials.
- Collaborate with professors to integrate information literacy into academic curriculum.
- Develop systematic methods for assessing digital resources and services based on use statistics and user input.

8.4 Recommendations for University Administration and Policymakers

University administrators should view libraries as important partners in academic advancement and give ongoing financial and policy support for digital projects. Investment in ICT infrastructure, manpower, and the acquisition of digital resources is critical to ensuring service quality.

At the policy level, improving consortium-based access models and promoting open-access efforts can enhance fairness and cost-effectiveness. Policymakers should support institutional collaboration while also promoting national and regional digital library programs.

8.5 Directions for Future Research

The study provides various areas for further research in the field of digital libraries. Comparative research across various types of universities, such as public and private, can provide a deeper understanding of digital library practices. Longitudinal studies can investigate changes in usage habits and the influence of academic factors over time.

Further study might delve into developing areas such as research data management, artificial intelligence applications in libraries, and the function of digital libraries in enabling online and blended learning.

8.6 Concluding Remarks

Today's academic libraries rely heavily on digital materials and services. The findings of this monograph reinforce the vital role of central libraries in advancing higher education and research through excellent digital services. By addressing identified obstacles and implementing best practices, university libraries may strengthen their contribution to academic achievement and knowledge development.

This monograph is intended to be a valuable resource for library professionals, academics, educators, and policymakers interested in digital library development in higher education institutions.

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Date: 30.06.2026

Place: Shirpur, Dhule

CERTIFICATE / APPROVAL BY RESEARCH GUIDE

This is to certify that the monograph entitled: **“Digital Library Resources & Services in Deemed University Libraries in Maharashtra: Access, Usage, and Academic Impact”** is prepared by **Sima Ingole** based on the thesis entitled: **“Uses of Digital Resources & Services in the Central Library of Deemed Universities in Maharashtra State: An Evaluative Study”** submitted to **SHPT School of Library Science**, SNDT Women’s University for the award of PhD degree under my guidance.

I have examined the manuscript and approve it for publication as a monograph.

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Dr. Sima Ingle is an accomplished Library and Information Science professional with over 17 years of experience in academic libraries. She currently serves as Assistant Librarian at SVKM's NMIMS Deemed University, Shirpur Campus. She holds a Ph.D. from SNDT Women's University, Mumbai (2025), and has qualified the SET examination conducted by Savitribai Phule Pune University. She specializes in library automation, digital resource management, open-source library software (KOHA), and technology-driven library services. Her research primarily focuses on digital library usage, user satisfaction, digital transformation, and emerging technologies in academic libraries. She has published 4 research papers in reputed international and national journals and presented 9 papers at various conferences. She has actively participated in refresher courses, workshops, webinars, and national/international conferences related to AI-based smart libraries, digital services, plagiarism detection, open educational resources, and sustainability in library systems. She received the Best Employee Award (2023) from SVKM's NMIMS Deemed University and has also served as an Organizing Secretary for a National & International Conference.

Dr. Sima Ingle is dedicated to integrating innovative technologies in academic libraries and strengthening digital services to support research and higher education. She demonstrates effective leadership in organizing academic and professional activities and continuously adapts to emerging technologies to improve library services. With strong work ethics and a forward-looking vision, she actively advances digital library initiatives and enhances information access in higher education institutions.

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Dr. Chavan is the President of the Bombay Science Librarians Association and has served on key university bodies, including the Academic Council and Senate. He has been a Member of the Board of Studies in Library and Information Science at Dr. Babasaheb Ambedkar Marathwada University and formerly chaired the Board of Studies at SNDT Women's University. Renowned for his leadership, academic administration, and commitment to advancing libraries and higher education, he continues to inspire students, researchers, and library professionals nationwide.

About the Monograph

In an era of rapid digital transformation, academic libraries have emerged as vital knowledge hubs that support teaching, learning, and research through innovative digital resources and services. This monograph examines the accessibility, usage, and academic impact of digital library services in deemed university libraries across Maharashtra, highlighting their role in enhancing information access, research productivity, and scholarly engagement. It explores key issues related to digital resource availability, user awareness, technological infrastructure, and service effectiveness while addressing challenges that influence optimal utilization. The work offers valuable insights for librarians, educators, researchers, policymakers, and higher education institutions seeking to strengthen digital learning environments and advance academic excellence.

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