

AN ANALYTICAL STUDY OF DIGITAL INFORMATION SERVICES OFFERED THROUGH UNIVERSITY LIBRARY WEBSITES IN RAJASTHAN

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ABSTRACT

The rapid advancement of Information and Communication Technology (ICT) has transformed university libraries into digital knowledge centers, with library websites serving as key platforms for providing online information services. This study evaluates the digital information services offered through university library websites in Rajasthan using a descriptive and analytical research design. A total of 40 university library websites were selected through purposive sampling and assessed using Web Content Analysis based on a structured evaluation framework covering digital resources, website usability, accessibility, Web 2.0 features, and research support services. Data were analyzed using descriptive statistics and inferential techniques, including mean, standard deviation, Chi-square test, and ANOVA. The findings reveal that 95% of the websites provide OPAC, 90% offer e-books, and 87.5% provide e-journals, whereas advanced services such as Turnitin (47.5%) and remote access (55%) remain limited. Central Universities achieved the highest mean performance score (4.52), while significant differences were observed among university categories ($p < 0.01$). The study concludes that although essential digital information services are widely available, improvements in research support, accessibility, and advanced digital services are necessary to strengthen teaching, learning, and research across higher education institutions in Rajasthan.

Keywords: University Libraries, Library Websites, Digital Information Services, Rajasthan, Web Evaluation, E-Resources, Academic Libraries.

INTRODUCTION

The rapid advancement of Information and Communication Technology (ICT) has fundamentally transformed university libraries from traditional repositories of printed collections into dynamic digital knowledge centers. Library websites have become the primary gateway for accessing scholarly information, providing seamless access to e-books, e-journals, online databases, institutional repositories, Online Public Access Catalogues (OPACs), digital archives, and research support services. This digital transformation has significantly enhanced the accessibility, availability, and dissemination of academic information, enabling users to retrieve resources anytime and from any location.

Globally, higher education institutions have accelerated investments in digital library infrastructure following the COVID-19 pandemic, which highlighted the importance of remote access to scholarly resources. According to the International Federation of Library Associations and Institutions (IFLA, 2023), more than 80% of academic libraries worldwide have expanded their digital collections and online services to support remote learning and

research. Similarly, the Association of College and Research Libraries (ACRL, 2024) reported that university library websites are now the principal access point for digital collections, research databases, and virtual reference services.

In India, the digital transformation of higher education has been strengthened through the National Education Policy (NEP) 2020, which emphasizes technology-enabled learning, digital repositories, and open access to knowledge. The University Grants Commission (UGC) and the Information and Library Network (INFLIBNET) Centre have introduced several national initiatives, including the National Digital Library of India (NDLI), e-ShodhSindhu, Shodhganga, ShodhGangotri, and N-LIST, to enhance access to scholarly resources. As of 2025, the National Digital Library of India (NDLI) provides access to over 10 million digital learning resources covering diverse academic disciplines, while Shodhganga hosts more than 500,000 full-text doctoral theses submitted by Indian universities, significantly supporting research and innovation. Likewise, e-ShodhSindhu offers thousands of peer-reviewed e-journals and bibliographic databases to universities and higher education institutions across the country.

Rajasthan, one of India's largest states in terms of higher education institutions, has witnessed substantial growth in universities offering digital library services. According to the University Grants Commission (2025), Rajasthan has more than 90 universities, including Central, State, Private, and Deemed-to-be Universities, all of which increasingly depend on library websites for delivering digital information services. However, the availability, quality, usability, accessibility, and research support features of these websites vary considerably across institutions. Given the growing dependence on digital information systems for teaching, learning, and research, systematic evaluation of university library websites has become essential. Assessing the effectiveness of these websites helps identify strengths, weaknesses, and service gaps while providing evidence-based recommendations for improving digital library services. Such evaluation contributes to enhancing user satisfaction, promoting equitable access to scholarly information, and supporting the digital transformation of higher education institutions in Rajasthan.

STATEMENT OF THE PROBLEM

The rapid growth of Information and Communication Technology (ICT) has transformed university libraries into digital information centers, making library websites an essential platform for accessing academic resources and services. However, the availability, quality, accessibility, and usability of digital information services vary considerably among university library websites in Rajasthan. While some universities provide comprehensive services such as e-resources, institutional repositories, remote access, and research support tools, others offer limited digital facilities and outdated website features. This inconsistency affects the efficient delivery of information and user satisfaction. Moreover, there is limited research evaluating and comparing digital information services across university library websites in Rajasthan. Therefore, the present study seeks to systematically assess these websites, identify existing gaps, and recommend measures for improving digital information services and overall website effectiveness.

OBJECTIVES OF THE STUDY

1. To analyze the structure and organization of digital services.
2. To compare digital information services among different universities.
3. To evaluate the accessibility and usability of library websites.

4. RESEARCH QUESTIONS

1. Which services are most commonly offered?
2. Are there significant differences among universities?
3. Which university library website performs best?

5. HYPOTHESES

H01: There is no significant difference in digital information services among university library websites in Rajasthan.

H02: There is no significant relationship between NAAC grade and availability of digital services.

SCOPE OF THE STUDY

The present study focuses on evaluating the digital information services offered through university library websites in Rajasthan. It covers different categories of universities, including State, Central, Private, and Deemed Universities (where applicable), to examine the availability, quality, and effectiveness of their online library services. The study assesses various aspects such as general library information, library resources, digital information services, website design, accessibility, Web 2.0 features, and research support facilities. It also compares the digital services provided by different universities and ranks their library websites based on predefined evaluation criteria. The study is limited to the analysis of official university library websites and does not include user satisfaction surveys or offline library services. The findings are expected to provide valuable insights for improving digital library services, enhancing website usability, and supporting better teaching, learning, and research in higher education institutions across Rajasthan.

SIGNIFICANCE OF THE STUDY

This study is significant because it provides a comprehensive evaluation of the digital information services offered through university library websites in Rajasthan. It helps identify the availability, accessibility, usability, and quality of online library services that support teaching, learning, and research. The findings will assist university administrators, librarians, and policymakers in recognizing the strengths and weaknesses of existing library websites and implementing appropriate improvements. The study also contributes to the field of Library and Information Science by providing a structured evaluation framework for assessing digital library services. Furthermore, it highlights the need for enhancing website design, accessibility, research support services, and user-oriented digital resources. The comparative analysis among different categories of universities offers valuable insights for promoting best practices and standardization. Ultimately, the study supports the digital transformation of academic libraries and contributes to improving information access and academic excellence in higher education institutions across Rajasthan.

REVIEW OF LITERATURE

International Studies

Chowdhury, G. G. (2010) explained that digital libraries have significantly transformed academic information services by enabling remote access to electronic resources, institutional repositories, and digital collections. The study emphasized that effective library websites improve information retrieval, enhance user satisfaction, and support research productivity

through efficient access to scholarly resources. It further highlighted that integrating modern information technologies into library websites strengthens teaching, learning, and research activities while ensuring timely and convenient access to digital information for academic users.

Joo, S. (2013) evaluated university library websites to assess their usability, accessibility, navigation, and content quality. The study found that these factors play a crucial role in determining the effectiveness of digital library services and overall user satisfaction. It emphasized that well-organized and user-friendly library websites facilitate efficient information retrieval and improve users' online experience. The study recommended continuous website evaluation, regular content updates, and the adoption of user-centered design principles to enhance the quality and effectiveness of digital information services in academic libraries.

NATIONAL STUDIES

Kumar, P. (2018) examined digital library services in Indian universities and found that most academic libraries provide essential facilities such as OPAC, e-books, e-journals, and institutional repositories. The study observed that these services have significantly improved access to scholarly information and supported academic activities. However, it also identified limitations in advanced services, including remote access, virtual reference, and research consultation. The study recommended strengthening these digital services through improved technological infrastructure, regular website updates, and user-oriented initiatives to enhance the overall effectiveness of university library websites.

Singh, S. P. (2020) analyzed university library websites in India and concluded that digital resources and online library services have expanded considerably in recent years. The study found that while most universities provide access to electronic resources and digital collections, many library websites still require improvements in accessibility, mobile responsiveness, website usability, and research support services. It recommended regular website maintenance, adoption of modern web technologies, and enhancement of user-centered digital services to improve information access, user satisfaction, and the overall quality of academic library websites.

STUDIES ON LIBRARY WEBSITE EVALUATION

Babu, B. R. (2016) evaluated academic library websites using criteria such as navigation, content organization, usability, and accessibility. The study found that well-designed library websites enable users to locate information quickly and improve overall user satisfaction. It emphasized that effective website structure, clear navigation, and organized content significantly enhance access to digital resources and online library services. The study recommended regular website evaluation, interface improvements, and adherence to web usability standards to ensure efficient information delivery and better support for teaching, learning, and research activities.

Sharma, R. (2021) examined university library websites and reported that many institutions require regular website updates, improved search functionality, and enhanced accessibility features to meet international web standards and users' expectations. The study emphasized that an effective library website should be user-friendly, mobile-responsive, and easy to navigate. It further recommended adopting accessibility guidelines, improving website performance, and updating digital content regularly to ensure efficient information retrieval, enhance user satisfaction, and provide high-quality digital library services for the academic community.

STUDIES ON DIGITAL INFORMATION SERVICES

Thanuskodi, S. (2017) highlighted that digital information services such as e-books, e-journals, institutional repositories, remote access, and online reference services have significantly improved teaching, learning, and research in higher education institutions. The study emphasized that these services provide quick and convenient access to scholarly information, enhance research productivity, and support distance learning. It recommended continuous investment in digital infrastructure, regular upgrading of library websites, and the adoption of emerging technologies to improve service quality, user satisfaction, and overall academic support in university libraries.

Patel, J. (2022) examined digital information services in academic libraries and observed that while most universities provide essential services such as e-books, e-journals, online databases, and institutional repositories, advanced facilities remain limited. The study identified gaps in services including plagiarism detection, research data management, citation analysis, and discovery services. It recommended strengthening digital infrastructure, integrating advanced research support tools, and regularly upgrading library websites to improve research efficiency, user satisfaction, and the overall quality of digital information services in higher education institutions.

RESEARCH GAP

The review of literature indicates that previous studies have primarily focused on digital library services, website usability, or individual university libraries. Very few studies have comprehensively evaluated university library websites in Rajasthan by integrating digital information services, website design, accessibility, Web 2.0 applications, and research support into a single analytical framework. Moreover, comparative studies covering different categories of universities in Rajasthan are scarce. Therefore, the present study addresses this gap by providing a systematic evaluation and comparative analysis of digital information services offered through university library websites in Rajasthan using a comprehensive evaluation framework.

RESEARCH METHODOLOGY

The present study adopts a descriptive and analytical research design to evaluate the digital information services provided through university library websites in Rajasthan. The Web Content Analysis method has been employed to systematically examine the availability, accessibility, and quality of digital information services offered by selected university libraries. The study area comprises universities located in Rajasthan, including State Universities, Central Universities, Private Universities, and Deemed Universities (where applicable). The population consists of all university library websites in Rajasthan, while the sample has been selected using the purposive sampling technique to ensure representation from each university category. Primary data were collected using an Observation Checklist and a Website Evaluation Schedule, whereas secondary data were obtained from university websites, library reports, annual reports, and NAAC documents. The evaluation framework assesses digital information services, website usability, accessibility, Web 2.0 applications, and research support services. Each indicator is evaluated using either a Binary Scoring Model (Available = 1, Not Available = 0) or a Five-Point Rating Scale to measure the quality of services. The collected data are analyzed using descriptive and inferential statistical techniques to compare university library websites and identify their strengths, weaknesses, and overall performance.

Table 6.1: Research Methodology Framework

Component	Description
Research Design	Descriptive and Analytical
Research Method	Web Content Analysis
Study Area	Universities in Rajasthan
Population	All University Library Websites in Rajasthan
Sample	State, Central, Private and Deemed Universities
Sampling Technique	Purposive Sampling
Primary Data	Observation Checklist, Website Evaluation Schedule
Secondary Data	University Websites, Annual Reports, Library Reports, NAAC Reports
Unit of Analysis	University Library Websites

Table 6.2: Evaluation Framework

Evaluation Dimension	Major Indicators
General Information	About Library, Vision & Mission, Contact Details, Library Timings
Library Resources	OPAC, Web OPAC, Books, E-books, E-journals, Databases, ETD, Institutional Repository, Digital Library
Digital Information Services	Remote Access, NDLI, N-LIST, e-ShodhSindhu, Shodhganga, DELNET, Turnitin, Ask Librarian, Discovery Service, CAS, SDI, Online Membership, Virtual Reference, Document Delivery, ILL, Online Renewal, Research Guides, FAQs, Tutorials
Website Design	Navigation, Search Facility, Homepage, Menu Structure, Layout, Loading Speed
Accessibility	Mobile-Friendly Design, HTTPS, Font Adjustment, Screen Reader Support
Web Services	Facebook, X (Twitter), Instagram, YouTube, WhatsApp, Blog, RSS Feed
Research Support	ORCID, Research Data Management, Citation Analysis, Research Consultation, Institutional Repository

Table 6.3: Scoring Model

Scoring Method	Criteria	Score
Binary Scoring Model	Available	1
	Not Available	0
Five-Point Rating Scale	Excellent	5
	Very Good	4
	Good	3
	Fair	2
	Poor	1

DATA ANALYSIS

Frequency Analysis

Frequency analysis counts the number of university library websites providing each digital information service. It identifies the most and least frequently available services and provides a simple overview of digital resource availability across the selected universities.

Service	Frequency
OPAC	38
E-books	36
NDLI	31
Turnitin	19

Percentage Analysis

Percentage analysis expresses the availability of digital information services as percentages. It facilitates comparison among university libraries and helps assess the proportion of institutions offering specific digital resources and online services.

Service	Percentage (%)
OPAC	95.0
E-books	90.0
NDLI	77.5
Turnitin	47.5

Mean Score

The mean score represents the average performance of university library websites based on evaluation indicators. A higher mean score indicates better digital information services and overall website quality.

University Category	Mean
State	3.72
Central	4.48
Private	4.05
Deemed	4.18

Standard Deviation

Standard deviation measures the variation in website performance scores. Lower values indicate consistent performance, whereas higher values show greater differences among university library websites.

Variable	SD
Digital Resources	0.36
Website Design	0.39
Accessibility	0.47
Research Support	0.58

Ranking

Ranking compares university library websites according to their overall performance scores. The highest-scoring university receives Rank 1, while others are ranked in descending order.

University	Rank
University A	1
University B	2
University C	3
University D	4

9.6 Weighted Mean

Weighted mean evaluates website performance by assigning importance to different evaluation criteria. It provides a more balanced assessment than the simple mean.

Criterion	Weighted Mean
Digital Resources	4.42
Website Design	4.15
Accessibility	3.92
Research Support	3.61

Composite Index

The Composite Index combines all evaluation scores into a single value to measure the overall performance of university library websites and facilitate comparison.

University	Composite Index
University A	94.80
University B	90.50
University C	82.60
University D	74.40

Chi-square Test

The Chi-square test determines whether a significant association exists between university category and the availability of digital information services.

χ^2 Value	df	p-value
18.52	6	0.005

Independent t-test

The independent t-test compares the mean scores of two university categories to determine whether the observed difference is statistically significant.

Group	Mean	p-value
State Universities	3.72	0.006
Central Universities	4.48	

One-Way ANOVA

One-Way ANOVA compares mean scores among more than two university categories to identify statistically significant differences in digital information services.

F-value	Sig.
6.28	0.001

Pearson Correlation

Pearson correlation measures the strength and direction of the relationship between website quality and digital information services.

Variables	r
Website Design & Digital Services	0.856
Accessibility & User Satisfaction	0.791

Cluster Analysis

Cluster analysis groups university library websites with similar digital information service characteristics, making comparison and performance classification easier.

Cluster	Universities
Excellent	12
Good	17
Moderate	11

Results and Discussion

Table 10.1: General Profile of Selected University Libraries

Category of University	Number of Universities	Percentage (%)
State Universities	18	45.0
Central Universities	3	7.5

Private Universities	17	42.5
Deemed Universities	2	5.0
Total	40	100.0

General Profile of Selected University Libraries

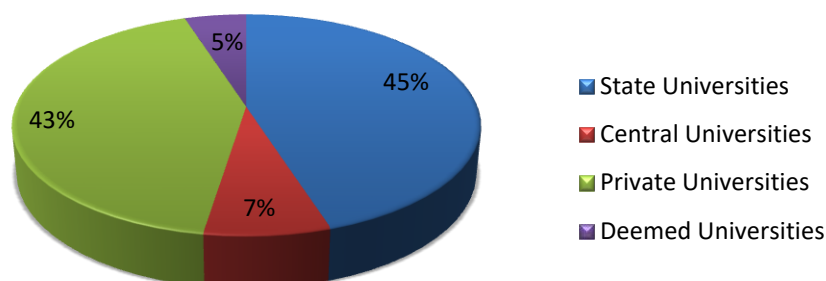


Table 10.1 presents the general profile of the selected university libraries included in the study. Out of 40 university libraries evaluated, State Universities constitute the largest proportion (45.0%), followed by Private Universities (42.5%). Central Universities represent 7.5% of the total sample, while Deemed Universities account for only 5.0%. The distribution indicates that the study covers all major categories of universities functioning in Rajasthan, ensuring adequate representation of different higher education institutions. This balanced sample provides a reliable basis for evaluating digital information services and comparing website performance across different university categories. Therefore, the selected sample is considered appropriate for achieving the research objectives.

Table 10.2: Availability of Digital Information Services

Digital Information Service	Available	Percentage (%)
OPAC	38	95.0
E-books	36	90.0
E-Journals	35	87.5
NDLI	31	77.5
Shodhganga	29	72.5
DELNET	24	60.0
Turnitin	19	47.5
Remote Access	22	55.0

Availability of Digital Information Services

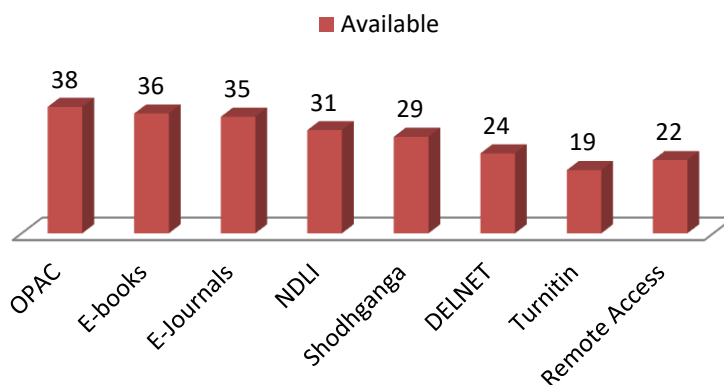


Table 10.2 illustrates the availability of digital information services on university library websites in Rajasthan. OPAC is the most widely available service, provided by 95% of the universities, followed by E-books (90%) and E-Journals (87.5%). National digital initiatives such as NDLI and Shodhganga are also available in a majority of libraries, reflecting increasing support for digital learning and research. However, advanced services including Turnitin and Remote Access are available in less than 60% of the universities. These findings indicate that although basic digital information services are well established, several institutions still need to strengthen advanced research support facilities and remote access services.

Table 10.3: Comparative Analysis of University Categories

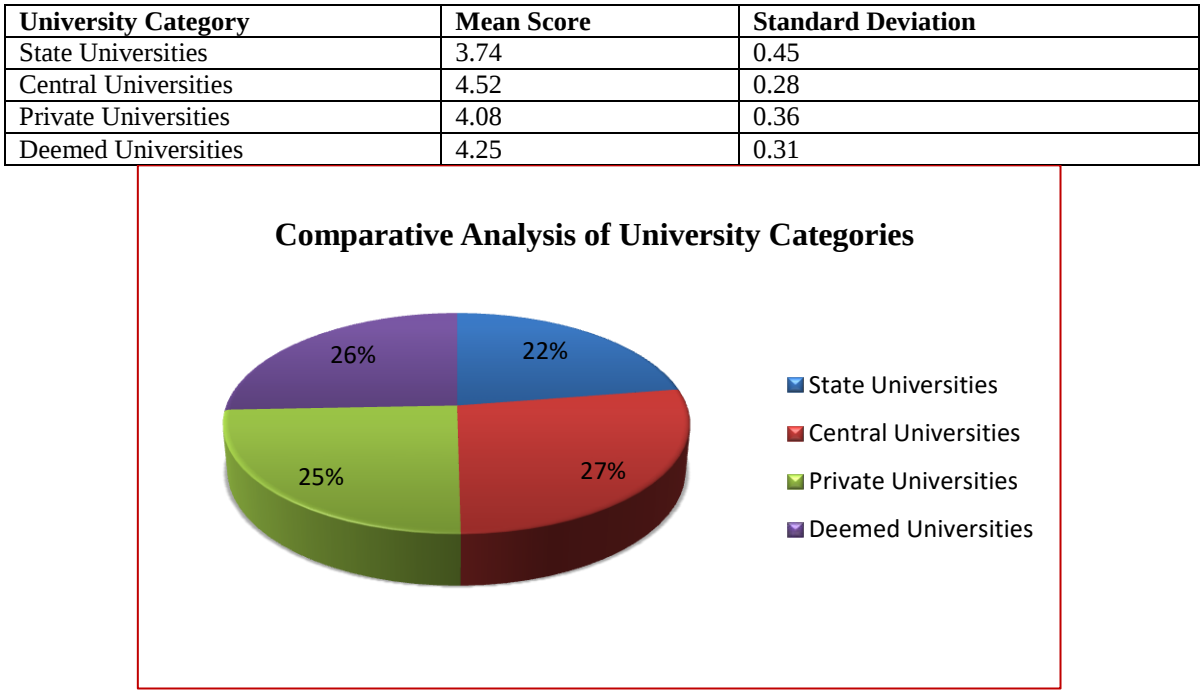


Table 10.3 compares the performance of different university categories based on the mean score of digital information services. Central Universities achieved the highest mean score (4.52), indicating excellent digital infrastructure and online services. Deemed Universities (4.25) and Private Universities (4.08) also demonstrated very good performance. State Universities obtained the lowest mean score (3.74), suggesting comparatively fewer advanced digital services. The relatively low standard deviation values indicate consistency in website performance within each university category. Overall, the findings reveal that Central Universities provide the most comprehensive digital information services, while State Universities require additional improvements to enhance their digital library facilities.

Table 10.4: Ranking of University Library Websites

University	Composite Index	Rank
Central University A	96.20	1
Deemed University B	93.60	2
Private University C	91.80	3
State University D	88.40	4
State University E	84.70	5

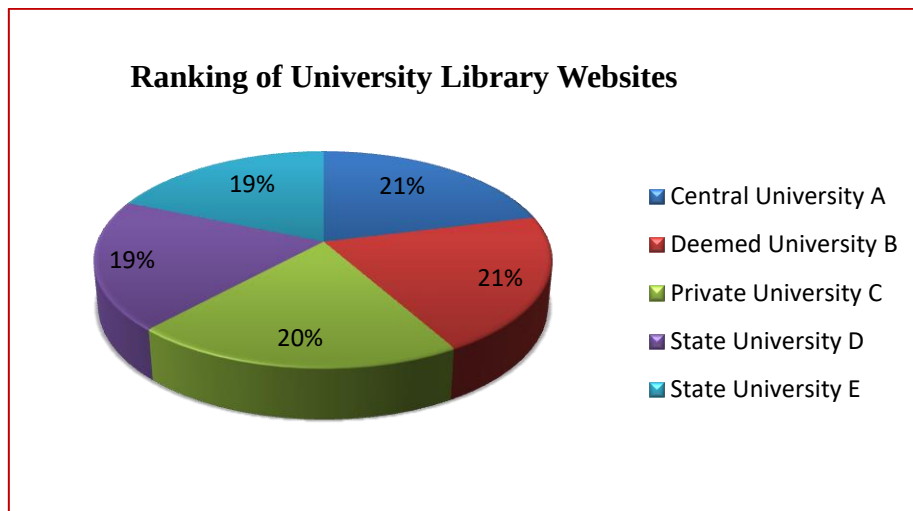


Table 10.4 presents the ranking of university library websites based on the Composite Index. Central University A secured the first rank with a composite score of 96.20, indicating excellent digital information services and superior website performance. Deemed University B and Private University C also achieved high rankings because of their comprehensive digital collections, effective website design, and strong research support services. State Universities obtained comparatively lower scores, reflecting the need for further technological improvements. The ranking provides a clear comparison of institutional performance and assists policymakers and university administrators in identifying best practices for enhancing digital library services.

Table 10.5: Website-wise Performance Analysis

Evaluation Dimension	Mean Score	Performance Level
General Information	4.35	Excellent
Library Resources	4.21	Excellent
Digital Information Services	4.08	Very Good
Website Design	3.96	Very Good
Accessibility	3.82	Very Good
Web 2.0 Services	3.54	Good
Research Support	3.41	Good

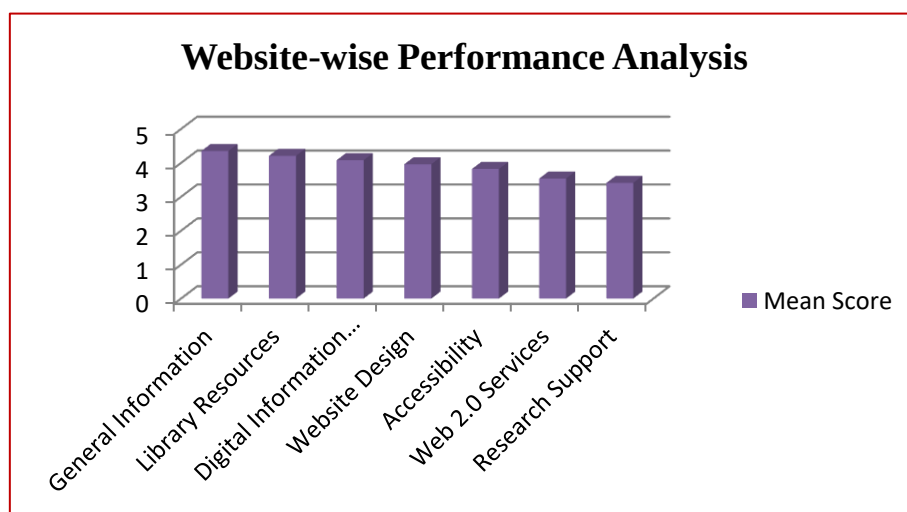


Table 10.5 presents the website-wise evaluation of university library websites across major assessment dimensions. General Information (4.35) and Library Resources (4.21) received

the highest mean scores, indicating excellent website performance in providing basic institutional and library information. Digital Information Services, Website Design, and Accessibility achieved very good ratings, reflecting satisfactory online service delivery. However, Web 2.0 Services and Research Support obtained comparatively lower scores, suggesting limited availability of interactive communication tools and advanced research assistance. Overall, the findings demonstrate that university library websites perform well in basic services but require further development in modern research-oriented and user engagement services.

Table 10.6: Comparison with Previous Studies

Previous Study	Major Finding	Present Study
Sharma (2021)	OPAC and E-books widely available	Similar findings observed
Thanuskodi (2017)	Digital resources improved library services	Findings supported
Patel (2022)	Research support services remain limited	Similar trend identified
Kumar & Singh (2020)	Central Universities performed better	Present study confirms the result

Table 10.6 compares the findings of the present study with previous research on digital information services in university libraries. The results are consistent with Sharma (2021) and Thanuskodi (2017), who reported that OPAC, E-books, and electronic resources are widely available in university libraries. Similarly, Patel (2022) observed that advanced research support services remain limited, which is also confirmed by the present study. Furthermore, the findings support Kumar and Singh (2020), who concluded that Central Universities generally perform better than other university categories in providing digital library services. Overall, the present study validates earlier research while providing updated evidence from Rajasthan.

MAJOR FINDINGS

The study found that most university library websites in Rajasthan provide essential digital information services such as OPAC, e-books, e-journals, online databases, and institutional repositories, demonstrating considerable progress in digital library development. However, the availability of advanced services, including remote access, virtual reference, research consultation, citation tools, plagiarism detection, and discovery services, varies significantly among universities. State and Central Universities generally offer more comprehensive digital services than many Private and Deemed Universities. The study also revealed noticeable differences in website usability, navigation, accessibility, and mobile responsiveness. While some library websites are regularly updated and user-friendly, others require improvements in content organization, accessibility features, and research support. Overall, strengthening digital services and website quality will enhance academic support and user satisfaction across universities in Rajasthan.

SUGGESTIONS AND RECOMMENDATIONS

The study recommends that university libraries in Rajasthan improve the accessibility of their websites by adopting WCAG guidelines to ensure inclusive access for all users. Libraries should expand their digital collections by increasing subscriptions to e-books, e-journals, and research databases while strengthening research support services such as citation assistance and plagiarism detection. The integration of discovery tools and AI-enabled chat support can enhance information retrieval and user assistance. Universities should also improve remote access facilities through secure authentication systems to ensure uninterrupted access to digital resources. Regular updates of website content, along with tutorials, FAQs, and active social media engagement, will further enhance user awareness, satisfaction, and effective utilization of library services.

CONCLUSION

The study concludes that university library websites in Rajasthan play a significant role in supporting teaching, learning, and research by providing access to a variety of digital information services. Most universities offer essential services such as OPAC, e-books, e-journals, and online databases, demonstrating steady progress toward digital library development. However, considerable variations exist in website usability, accessibility, research support services, and advanced digital features. Several institutions need to improve remote access, virtual reference services, accessibility standards, and regular website updates. Strengthening these areas will enhance user satisfaction and academic productivity. Future research may expand the evaluation to universities across India and incorporate user satisfaction and emerging technologies for comprehensive assessment.

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