International Journal of Engineering, Science and Humanities
An international peer reviewed, refereed, open access journal
Impact Factor: 8.3 www.ijesh.com ISSN: 2250 3552

Digital Library Education and Training in Higher Education: Opportunities and Challenges in Jaipur, Rajasthan

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Abstract-The rapid advancement of digital technologies has transformed traditional library systems into digital libraries, significantly enhancing access to information and supporting academic and research activities. This study examines the possibilities and challenges of digital library education and training in higher education institutions, with special reference to Jaipur, Rajasthan. The research adopts a descriptive and exploratory design, utilizing both primary and secondary data. Primary data were collected through structured questionnaires administered to students and faculty members, while secondary data were obtained from academic journals, books, and online sources. Statistical tools such as ANOVA, regression, and t-tests were applied for data analysis. The findings indicate that digital libraries provide substantial opportunities, including improved accessibility, flexibility in learning, and enhanced research efficiency. However, several challenges such as inadequate infrastructure, lack of trained personnel, low awareness levels, and financial constraints hinder their effective implementation. The study concludes that strengthening digital infrastructure, updating curricula, and providing adequate training programs are essential for maximizing the benefits of digital library education. The research offers valuable insights for policymakers, educators, and institutions to enhance digital library practices in higher education.

Keywords-Digital Libraries, Higher Education, Library Education, Digital Training, Information Technology, E-Learning, Information Access, Jaipur, Library and Information Science (LIS), Digital Infrastructure

I INTRODUCTION

In the era of rapid digital transformation, the role of libraries has evolved significantly from traditional repositories of printed materials to dynamic digital knowledge centers. Digital libraries have emerged as a crucial component of higher education, enabling seamless access to vast collections of academic resources, including e-books, journals, databases, and multimedia content. These systems not only enhance the efficiency of information retrieval but also support advanced learning, research, and knowledge sharing across geographical boundaries.

Digital library education and training have become essential in equipping students, faculty members, and library professionals with the necessary skills to effectively utilize digital resources

and technologies. As higher education institutions increasingly integrate digital platforms into their academic frameworks, the demand for competencies in information literacy, digital navigation, and resource management has grown substantially. Proper training ensures that users can maximize the benefits of digital libraries, thereby improving academic performance and research outcomes.

Despite the numerous advantages, the implementation of digital library education and training faces several challenges, particularly in developing regions. Issues such as inadequate technological infrastructure, lack of trained faculty, limited awareness, insufficient funding, and resistance to change hinder the effective adoption of digital library systems. These challenges create a gap between technological advancements and their practical application in educational institutions.

In this context, the present study focuses on examining the possibilities and challenges of digital library education and training in higher education, with special reference to Jaipur, Rajasthan. The study aims to explore the current status, identify opportunities for development, and analyze the barriers that affect the effective utilization of digital libraries. By addressing these aspects, the research seeks to contribute to the improvement of digital library practices and support the overall advancement of higher education in the region. Digital libraries have emerged as an essential component of modern higher education systems, enabling easy access to academic resources and enhancing research capabilities. With the increasing use of digital platforms, the need for proper education and training in digital library systems has become crucial. However, despite technological progress, institutions in Jaipur face challenges in adopting and implementing digital library education effectively**.**

The library is regarded as an integral part and heart of an institution/organisations. To improve the quality and infrastructure of academic libraries in India, national organisations like Government of India MHRD (Ministry of Human Resource Development), UGC (University Grants Commission), NAAC (National Assessment and Accreditation Council), NKC (National Knowledge Commission), and various other educational commissions provide important guidelines for the academic libraries in India to measure the quality of higher education in India. In today's world most of the subjects are multidisciplinary and users or students are guided to the self-learning environment where a well-equipped library can provide them to go in the depth of the subject and to gain more advanced knowledge. Various digital platforms have been made available by MHRD (Ministry of Human Resource Development) for digital reading. The library since long time has been considered to be the source power of knowledge and also as a base of knowledge. In higher education and research, the library has specific functions to facilitate the extensive use of learning resources by students, researchers and teachers. With the growth of literature in large amount even in the same field, this group of libraries users has faced problems in identifying the appropriate literature for their use and consultation in a desired timeframe.

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Information and Communication Technology (ICT), particularly during the last two decades, has significantly contributed to open the door of accessing, hidden knowledge in a highly efficient manner. Initially Information and Communication Technology was used in the library environment for developing databases information resources mainly aiming at storing and retrieving. Information on various types of publication resources and also to organize various types of information services the ICT has put us in the electronic environment to help identifying, assessing, acquiring, recording, organizing, and disseminating information and information resources. According to Wikipedia "A digital library is a library in which collection is stored in digital formats as opposed to print, microform, or other media and accessible by computers. The digital content may be stored locally, or accessed remotely via computer networks. A digital library is a type of information retrieval system. The first use of the term digital library in print may have been in a 1988 report to the Corporation for National Research Initiatives [19].

Role of Digital Libraries in Learning

Digital libraries have revolutionized the way individual's access, consume, and engage with knowledge, profoundly transforming the learning landscape. As repositories of digital content, including books, journals, multimedia, and other educational resources, they serve as essential platforms for learners and educators alike. Their role in enhancing learning is multifaceted, touching on accessibility, resource diversity, interactivity, and personalized learning experiences.

One of the most significant advantages of digital libraries is accessibility. Unlike traditional libraries that are bound by physical constraints, digital libraries allow learners from across the globe to access a wide range of resources at any time and from anywhere. This is especially crucial for individuals in remote or underserved areas who may not have access to physical libraries. With just an internet connection, learners can explore vast amounts of knowledge, leveling the educational playing field and democratizing access to information.

Diversity of resources is another critical benefit. Digital libraries host a vast array of materials, including e-books, scholarly articles, videos, podcasts, and even interactive simulations. This diversity allows learners to approach subjects from multiple perspectives, catering to various learning styles. For example, visual learners can benefit from multimedia content, while those who prefer traditional reading can delve into digital books. Additionally, students and researchers have access to cutting-edge publications, databases, and academic papers that may not be available in physical libraries. [16] Digital libraries also promote interactivity and collaboration. Many platforms provide tools that enable users to highlight, annotate, and share content with peers and instructors. Some digital libraries also include discussion forums, where learners can engage in academic discussions, ask questions, and collaborate on projects. This kind of engagement encourages active learning and fosters a deeper understanding of complex topics. Moreover, digital libraries support personalized learning. With advanced search functions and algorithms, they allow users to tailor their learning experience by suggesting materials based on their interests, previous

searches, and academic goals. This personalization helps students focus on relevant content and optimize their study time, ultimately enhancing learning outcomes. In summary, digital libraries are a crucial asset in modern education, providing easy access to a diverse range of materials, encouraging collaboration, and enabling personalized learning experiences. As technology continues to evolve, digital libraries will remain an essential tool for fostering a more inclusive, engaging, and effective learning environment. [17].

Challenges in Using Digital Libraries for Teaching and Learning

Digital libraries have revolutionized access to academic resources, providing teachers and students with a wealth of information at their fingertips. However, while digital libraries offer numerous benefits, they also present distinct challenges in educational settings. These challenges can affect the effectiveness of teaching and learning, impacting both educators and learners. One significant challenge is the digital divide, which refers to the gap between individuals who have access to reliable internet and digital devices and those who do not. In many parts of the world, particularly in underprivileged areas, students and teachers may struggle to access digital libraries due to a lack of infrastructure or technology. This disparity creates unequal opportunities for learning, with some students benefiting from rich online resources while others are left behind.

Another major challenge is information overload. Digital libraries host vast amounts of data, including books, articles, research papers, and multimedia resources. While this variety is beneficial, it can overwhelm students and teachers alike. Without proper search skills, users may struggle to locate relevant information quickly. Filtering out low-quality or less relevant content can also be time-consuming, which may discourage users from fully utilizing digital libraries.

The issue of content quality and credibility is another concern. Not all resources in digital libraries are equally credible, and students may have difficulty distinguishing between peer-reviewed, reliable sources and less trustworthy ones. Teachers must take extra steps to guide students in evaluating the authenticity and academic rigor of the materials they encounter, which can add to their workload. [18]

Problems with how to use digital libraries and technical problems also make them less useful. Many digital libraries have complex user interfaces that may not be intuitive, especially for people who aren't good with technology. Navigation can be difficult, and search functionalities may not always deliver precise results. Also, some digital libraries don't work well on mobile devices, which makes it hard for people who use smartphones or tablets to learn. Digital rights management (DRM) and access restrictions further complicate the use of digital libraries. Many resources are locked behind paywalls or require institutional subscriptions, limiting accessibility for individual learners or smaller institutions. Even when resources are available, strict DRM policies may restrict how materials can be used, shared, or downloaded, limiting flexibility in teaching and learning. Finally, there is the challenge of pedagogical integration. While digital libraries provide resources, educators must still figure out how to effectively integrate these resources into their

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curricula. This requires thoughtful planning to ensure that the digital content aligns with learning outcomes, engages students, and complements other teaching methods [19].

II LITERATURE REVIEW

Author(s) & Year	Application Domain	Dataset / Context	Methodology / Techniques	Key Contributions / Findings	Performance Metrics
Naeem Iqbal *et al.*, 2020[15]	Academic library analytics	Jeju National University Library (Republic of Korea); 2.2M rental records, 78 parameters	Data mining, DNN, SVR, Random Forest	Proposed a predictive model for rental book forecasting to support library resource planning and management	MAE, MSE, RMSE
Delfina Ramos-Vidal *et al.*, 2021[16]	Digital library software systems	Semi-automatic digital library generation	Software Product Line (SPL), feature modeling	Developed an SPL-based framework to generate DL applications efficiently, reducing development effort	Development effort savings
Wouter Hajnal *et al.*, 2022[17]	Spectral libraries for remote sensing	Sentinel-2 imagery (Brussels urban area)	M-CORE, MUSIC extension, library pruning	Introduced a multi-step spectral library trimming approach improving land cover fraction mapping accuracy	Mapping accuracy improvement

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Yanghua Zhang *et al.*, 2022[18]	Android third-party library identification	3.9M+ Google Play apps	Clustering-based detection (LibHawkeye), dependency networks	Achieved higher precision in detecting external libraries without package homogeny assumptions	93.25% accuracy
Xian Zhan *et al.*, 2022[19]	Android third-party library analysis	74 studies (2012–2020)	Systematic Literature Review (SLR)	Presented taxonomy, challenges, and future research directions in Android TPL analysis	Qualitative synthesis
Xinfa Zhang *et al.*, 2023[20]	Standard cell libraries (VLSI)	16/14 nm technology nodes	Sensitivity analysis, aging-aware characterization	Reduced SPICE simulations while maintaining accuracy using crucial transistor identification	Avg. error 1%, speedup up to 305×
Jing Lin *et al.*, 2024[21]	Public library lighting systems	20 Swedish public libraries (>55°N)	Qualitative field study, interviews, gap analysis	Identified gaps in human-centric lighting practices and proposed improved asset management strategies	Qualitative outcomes
Yanan Zhang *et al.*, 2024[22]	Open-source software component libraries	30,000+ GitHub projects; vehicle firmware	Fingerprint-based feature extraction, SCA	Achieved high accuracy in binary component and version identification	83.33% (layout), 96.81% (version)

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Yimin Yin *et al.*, 2024[23]	Digital library security	R2L attack dataset; two digital libraries	PDCA framework, enhanced SVM	Proposed a continuous risk control model achieving high detection accuracy	96.46% accuracy
Pinjia Hu *et al.*, 2025[24]	Digital library recommendation systems	Large-scale digital library dataset	VAE, Adam optimizer, Lookahead	Improved catalogue optimization, recommendation accuracy, and user engagement	Accuracy & engagement gains

III RESEARCH METHODOLOGY

The study adopts a descriptive and exploratory research design. Primary data were collected through structured questionnaires distributed to students and faculty members, while secondary data were gathered from books, journals, and online sources. Statistical tools such as ANOVA, regression, and t-tests were used for analysis. A total of 380 valid responses were analyzed using a 5-point Likert scale.

STATISTICAL ANALYSIS

Software like SPSS will be used to process the data that was collected for statistical purposes and get test and results. Mean Rank and One-way ANOVA are used to look at how people feel about An Analysis of the Possibilities and Challenges in Digital Library Education and Training: with special reference to Jaipur state (Rajasthan).

Analysis of Percentages

Percentage analysis is a basic statistical approach that is often used to look at and understand primary data. It talks about how to find the proportion of people who answered a certain question out of the complete population that was studied. It's one of the easiest ways to look at data, and it's quite simple for everyone to understand the research's results. It is mainly used for research that comes with different charts.

Gender of Respondent

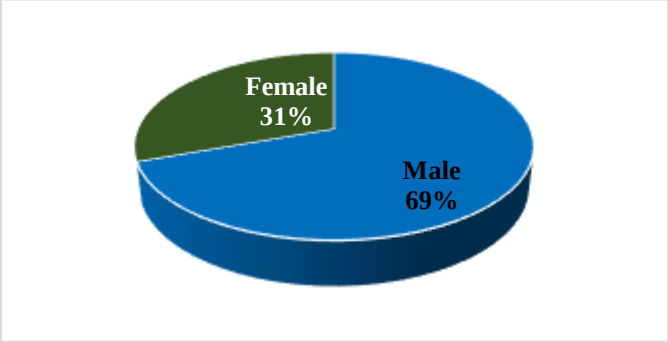

Figure 1 Gender of Respondent

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Figure.1 show the gender distribution of the respondents who participated in the study. Out of a total of 380 respondents, 264 (69.5%) were male, while 116 (30.5%) were female. This indicates that male participants formed a significantly larger proportion of the sample compared to female participants. The higher male representation may reflect the existing gender pattern within library and information science education and professional settings in Jaipur, influencing the overall perspectives captured in the study.

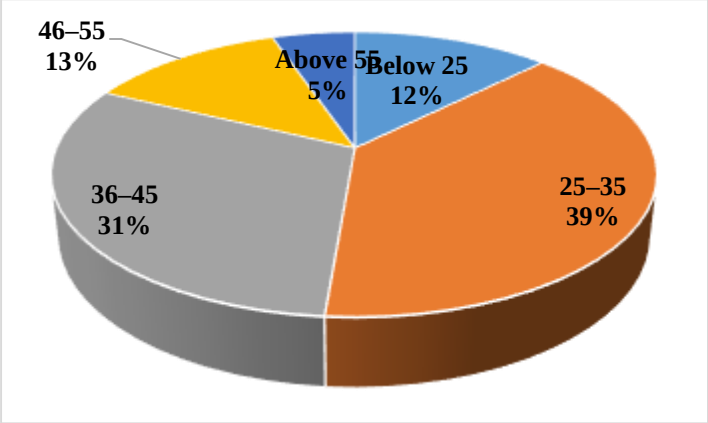

Figure 2 Age Group of Respondent

Figure 2 present the age-wise distribution of respondents in the study. Among the 380 participants, the largest group belonged to the 25–35 age category (38.7%), followed by those aged 36–45 years (30.8%). Respondents below 25 and between 46–55 years each accounted for 12.6%, while only 5.3% were above 55. This distribution indicates that the majority of participants were young and mid-career individuals, reflecting the active involvement of these age groups in digital library education and training.

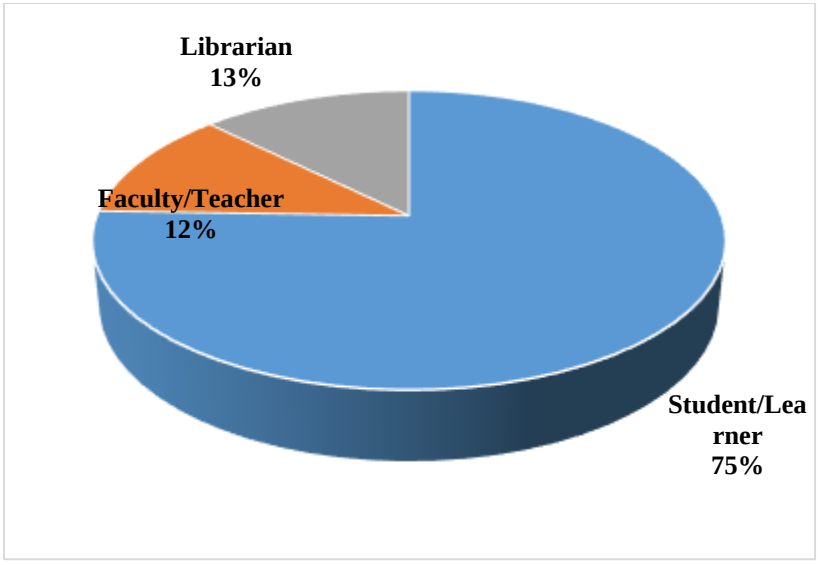

Figure 3 Occupation of Respondent

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Figure 3 present the occupational distribution of the respondents. Among the 380 participants, students or learners constitute the largest group with 287 respondents (75.5%). Faculty/teachers and librarians each represent 93 respondents (24.5%), showing an equal level of participation from both professional categories. This balanced representation across students, faculty, and librarians ensures diverse perspectives, making the findings more reliable for understanding digital library education and training in Jaipur.

Educational Qualification of Respondent

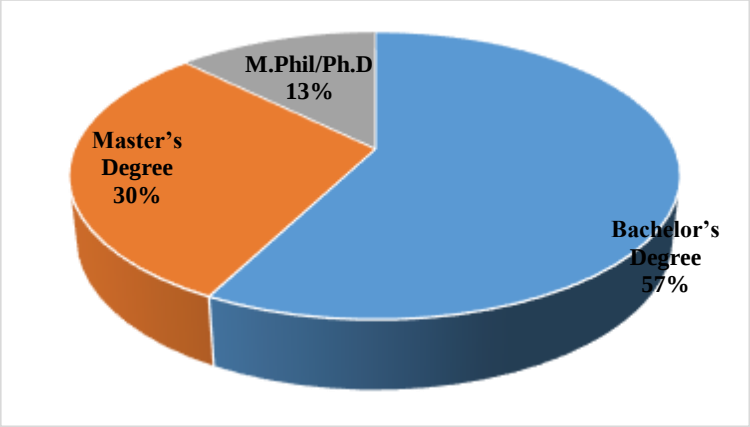

Figure 4 Educational Qualification of Respondent

Figure 4 show the educational qualification of the respondents. Out of 380 participants, the majority hold a Bachelor's degree (219 respondents, 57.6%), indicating that most respondents are at the undergraduate or early professional stage. A significant portion, 113 respondents (29.7%), possess a Master's degree, reflecting involvement from individuals with advanced academic exposure. Only 48respondents (12.6%) have an M.Phil or Ph.D. qualification. This distribution suggests that most participants are still progressing toward higher academic and professional specialization in the field.

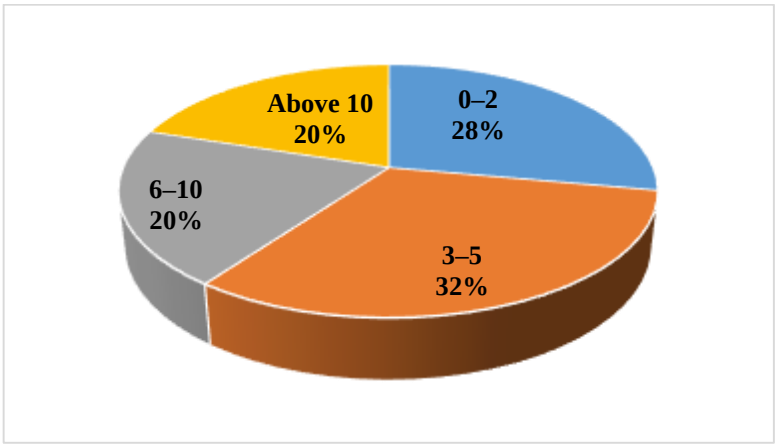

Figure 5 Years of Experience (for faculty/professionals) of Respondent

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Figure 5 present the distribution of respondents based on their years of experience. Among the 380 participants, the highest proportion (32.1%) have 3–5 years of experience, followed by 27.9% with 0–2 years. Respondents with 6–10 years and those with more than 10 years of experience each account for 20.0%. This balanced distribution across experience levels indicates that both early-career and seasoned professionals participated, providing a comprehensive understanding of digital library education and training practices in Jaipur.

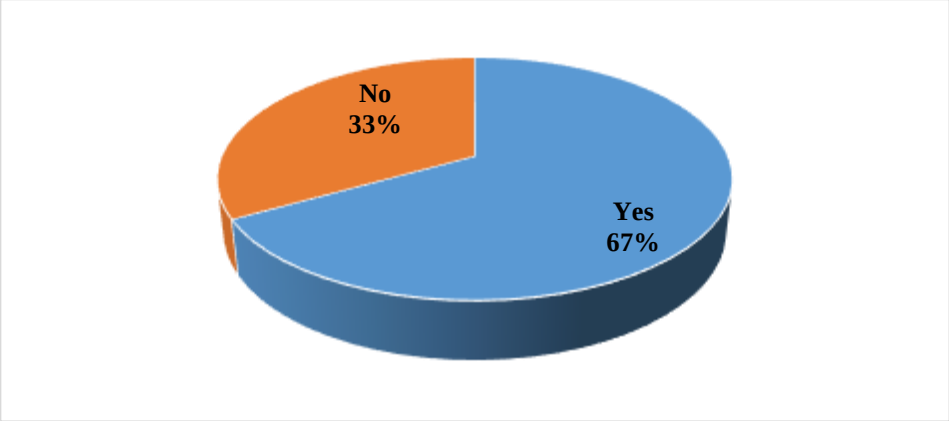

Figure 6 show the respondents' awareness of the concept of a digital library. Out of 380 participants, 254 respondents (66.8%) reported that they are aware of digital libraries, while 126 respondents (33.2%) indicated a lack of awareness. This clearly reflects that a majority of respondents have basic knowledge of digital library concepts, which is essential for effective participation in digital library education and training. However, the considerable proportion of unaware respondents highlights the need for improved awareness programs and orientation.

How frequently do you use digital libraries or e-resources?

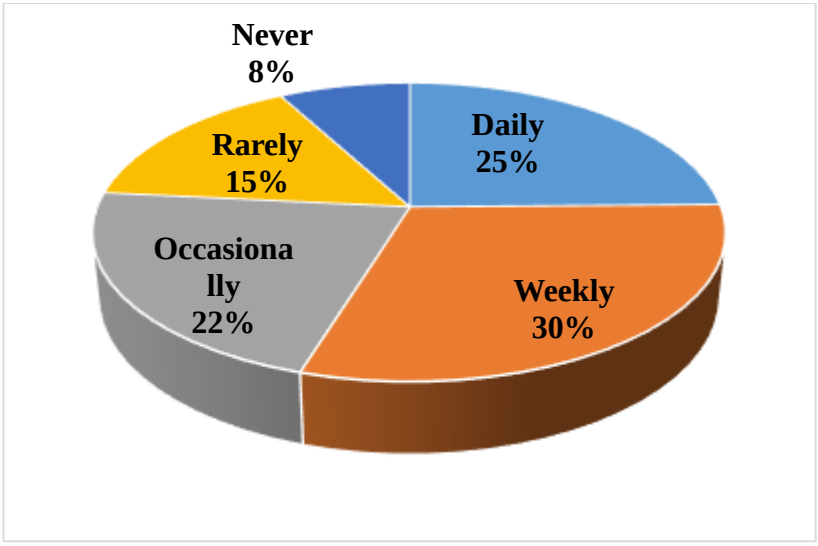

Figure 7 How frequently do you use digital libraries or e-resources?

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Figure 7 illustrate the frequency of digital library or e-resource usage among respondents. Out of 380 participants, 114 (30.0%) use digital libraries weekly, while 94 (24.7%) access them daily. Additionally, 83 respondents (21.8%) use them occasionally, and 59 (15.5%) use them rarely. Only 30 respondents (7.9%) reported never using digital libraries. This distribution indicates that a majority of respondents engage with digital resources regularly, reflecting growing reliance on digital information platforms for academic and professional needs.

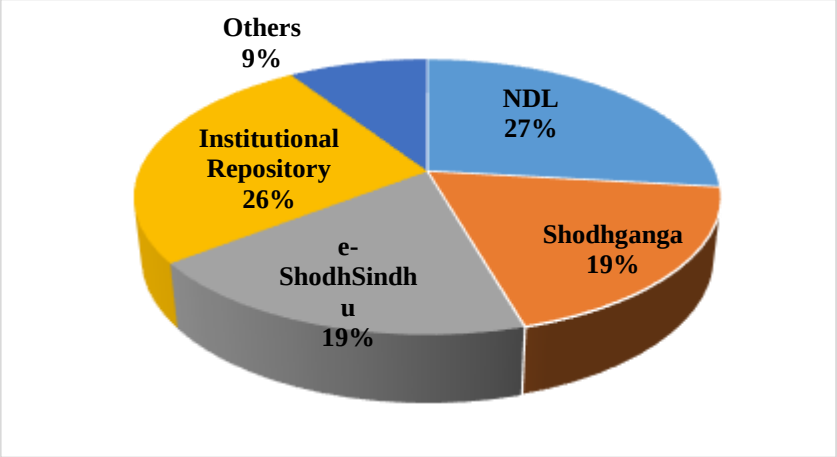

Figure 8 Which digital library platforms do you use most often?

Figure 8 present the preferred digital library platforms used by respondents. Among the 380 participants, NDL is used most often by 102 respondents (26.8%), followed closely by institutional repositories with 100 users (26.3%). e-ShodhSindhu and Shodhganga account for 18.9% and 18.7% respectively, indicating moderate usage. Additionally, 35 respondents (9.2%) reported using other digital platforms. This distribution shows that national-level platforms and institutional repositories are the most popular sources of digital information among users in Jaipur.

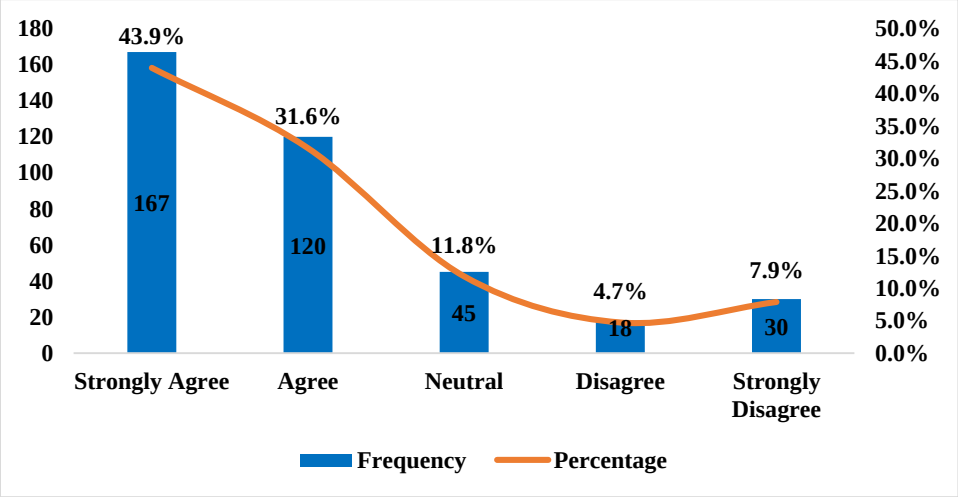

Figure 9 The use of digital libraries has improved access to learning and research materials.

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Figure 9 show respondents' opinions on whether digital libraries have improved access to learning and research materials. Out of 380 participants, a large majority either strongly agree (43.9%) or agree (31.6%), indicating widespread acknowledgment of the positive impact of digital libraries. Only 11.8% remained neutral, while 4.7% disagreed and 7.9% strongly disagreed. These results clearly suggest that digital libraries are perceived as highly beneficial in enhancing accessibility and supporting academic and research activities in Jaipur.

Statistical Analysis

One-Way ANOVA: we utilize the one-way analysis of variance (ANOVA) to find out if there are any statistically significant differences between the means of two or more independent variables.

T-test: A t-test is a statistical method used to compare the means of two groups to determine if there is a significant difference between them. There are different types of t-tests, including the independent samples t-test and the paired samples t-test.

Cronbach's Alpha

Table 1 Cronbach's Alpha Based on Standardized Items

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.917	0.921	59

Table 1presents the reliability statistics for the study's questionnaire using Cronbach's Alpha. The obtained value of 0.917, and 0.921 based on standardized items, indicates an exceptionally high level of internal consistency among the 59 items used in the survey. In social science research, a Cronbach's Alpha value above 0.70 is considered acceptable, above 0.80 is good, and above 0.90 is excellent. Therefore, the values reported here demonstrate that the questionnaire items are highly reliable and measure the constructs consistently. This strong reliability ensures the validity and credibility of the responses collected for the study.

Hypothesis1

H_{01}: There is no significant impact of digital library developments on the library and information environment in Jaipur.

H_{11}: There is a significant impact of digital library developments on the library and information environment in Jaipur.

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Table 2 Anova Digital library developments

ANOVA					
Digital library developments					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	124.149	22	5.643	19.860	.000
Within Groups	101.439	357	.284		
Total	225.588	379			

The objective of this hypothesis test was to examine whether digital library developments have a significant impact on the library and information environment in Jaipur. Table 4.69 presents the results of the ANOVA test conducted on responses related to digital library developments. The findings clearly indicate a statistically significant difference among the respondent groups, as reflected by the F-value of 19.860 and a p-value (Sig.) of 0.000, which is far below the conventional significance level of 0.05. The extremely low significance value ($p < 0.001$) confirms that the variations in responses are not due to random chance. Instead, the differences across the groups—whether categorized by occupation, experience level, or other demographic characteristics—are meaningful and attributed to the presence and influence of digital library developments. This strong statistical evidence directly contradicts the null hypothesis (H_{01}), which states that there is no significant impact of digital library developments on the library and information environment.

Since the ANOVA results reveal clear and significant differences, the null hypothesis (H_{01}) is rejected. In contrast, the alternative hypothesis (H_{11})—which proposes that digital library developments have a significant impact on the library and information environment in Jaipur is accepted. These results are consistent with earlier descriptive findings in the study, where a majority of respondents agreed that digital libraries have improved accessibility, enhanced user satisfaction, modernized traditional library services, and strengthened research performance. The ANOVA test reinforces these observations with statistical validation, confirming that digital library developments play a substantial and measurable role in transforming the library and information environment in Jaipur.

Hypothesis2

H_{02}: There is no significant level of acceptance and application of digital libraries among

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institutions in Jaipur.

H_{12}: There is a significant level of acceptance and application of digital libraries among institutions in Jaipur.

Table 3: Coefficients Acceptance and application

Coefficients[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1.012	.453		2.236	.026	.122	1.903
	Acceptance and application	.733	.111	.323	6.631	.000	.516	.950

Table 4 Model Acceptance and application

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.323[a]	.104	.102	1.146	.104	43.97	1	378	.000

The hypothesis examines whether there is a significant level of acceptance and application of digital libraries among institutions in Jaipur. To test this, a regression analysis was conducted, and the results are presented in Tables 4.70 and 4.71. The findings clearly demonstrate that acceptance and application of digital libraries significantly influence institutional engagement and usage patterns.

Table 4.70 shows that the predictor variable, Acceptance and Application, has an unstandardized coefficient (B) value of 0.733 with a standard error of 0.111. The corresponding t-value of 6.631 and the significance level (Sig. = 0.000) indicate that this predictor is statistically significant at the 0.05 level. Since the p-value is far below 0.05, the relationship between acceptance/application

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and institutional use of digital libraries is highly significant. The 95% confidence interval ranges from 0.516 to 0.950, which does not include zero, further confirming the strength and reliability of the predictor. Table 4.71 provides the model summary, showing an R-value of 0.323, indicating a moderate positive correlation between acceptance/application of digital libraries and their institutional use. The R Square value of 0.104 suggests that approximately 10.4% of the variation in institutional digital library application is explained by the acceptance level. While this represents a moderate effect size, it is statistically meaningful, especially in social science research where human behavior and institutional practices involve many influencing factors. The F-value of 43.97 with a significance level of 0.000 further confirms that the overall regression model is highly significant.

Given these findings, the null hypothesis (H_{02})—which states that there is no significant level of acceptance and application of digital libraries among institutions in Jaipur—is rejected. The alternative hypothesis (H_{12}) is accepted, indicating that acceptance and application levels significantly influence how institutions adopt and utilize digital libraries.

These statistical results align with descriptive data in earlier sections, where respondents consistently reported growing awareness, interest, and integration of digital libraries in academic settings. Faculty and students have also indicated active use of platforms like NDL, Shodhganga, and institutional repositories. The regression analysis reinforces these insights, proving that acceptance plays a key role in driving digital library implementation.

Hypothesis3

H_{03}: There is no significant availability of opportunities for education and training in the field of digital libraries in Jaipur.

H_{13}: There is a significant availability of opportunities for education and training in the field of digital libraries in Jaipur.

Table 5 Possibilities available for education and training

One-Sample Test						
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper

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Awareness and Usage of Digital Libraries	148.708	379	.000	4.0613	4.008	4.115
Possibilities available for education and training	99.079	379	.000	4.0400	3.960	4.120

The hypothesis examines whether significant opportunities exist for education and training in the field of digital libraries in Jaipur. To test this hypothesis, a one-sample t-test was conducted, and the results are presented in Table 4.71. The findings clearly demonstrate strong statistical evidence supporting the availability of such opportunities.

The test results for Possibilities available for education and training show a t-value of 99.079 with df = 379 and a highly significant p-value (Sig.) of 0.000, which is far below the standard alpha level of 0.05. This indicates that the sample mean differs significantly from the test value, confirming that respondents overwhelmingly perceive education and training opportunities in digital libraries to be available in Jaipur. The mean difference of 4.0400 on a five-point scale, with a confidence interval ranging from 3.960 to 4.120, reflects strong agreement among respondents. Since the lower bound and upper bound of the interval are both well above the neutral value of 3, this further substantiates the presence of strong positive perceptions regarding available opportunities. The one-sample test for Awareness and Usage of Digital Libraries also shows an extremely high t-value of 148.708 and a significant p-value of 0.000, confirming that respondents report high awareness and active usage of digital libraries. This high awareness complements the findings on opportunities for education and training, suggesting that increased digital library usage is supported by available training avenues. This statistical evidence, the null hypothesis (H_{03}), which states that there is no significant availability of opportunities for education and training in the field of digital libraries in Jaipur, is rejected. The alternative hypothesis (H_{13}) is accepted. These results align with earlier descriptive findings where respondents acknowledged the regular organization of workshops, hands-on access to digital library labs, and sufficient availability of online resources. Respondents also indicated institutional collaboration and government/private initiatives supporting training efforts. The statistical results strongly indicate that Jaipur provides significant opportunities for education and training in digital library technologies. This availability plays a crucial role in strengthening digital literacy, enhancing professional competencies, and supporting the overall development of digital library initiatives within the region.

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Impact Factor: 8.3 www.ijesh.com ISSN: 2250 3552

Hypothesis4

H_{04}: There is no significant influence of barriers on the acceptance of digital libraries as an area of study in education and training.

H_{14}: There is a significant influence of barriers on the acceptance of digital libraries as an area of study in education and training.

Table 6 The barriers of accepting Digital Libraries

ANOVA					
The barriers of accepting Digital Libraries					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11.060	22	.503	1.607	.042
Within Groups	111.663	357	.313		
Total	122.723	379			

The hypothesis evaluates whether barriers significantly influence the acceptance of digital libraries as an area of study in education and training. To test this, an ANOVA analysis was conducted, and the results are shown in Table 4.72. The findings provide clear statistical evidence regarding the role of barriers in shaping acceptance levels. The ANOVA results show a Sum of Squares Between Groups of 11.060 and Within Groups of 111.663, with corresponding mean square values of 0.503 and 0.313, respectively. There is some difference between the groups, as shown by the F-value of 1.607, and the p-value (Sig.) of 0.042 is less than the usual level of significance of 0.05. What this means is that the changes seen between groups are statistically important and not just random. Since the significance level is less than 0.05, we can say that hurdles do have an effect on how digital libraries are used in education and training. So, the null hypothesis (H_{01}), which says that walls don't have a big effect on acceptance, is not true. The alternative theory (H_{14}), which says that barriers have a big effect on how many people choose to study digital libraries, is accepted. These results align with earlier descriptive findings from the study, where respondents identified several major barriers such as lack of trained faculty, insufficient infrastructure, limited student awareness, outdated curriculum, financial constraints, and resistance to change from traditional library systems. The high percentages of respondents agreeing with these statements highlight that

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these barriers are widely experienced and perceived as obstacles in adopting digital library education.

The statistically significant ANOVA result confirms that these barriers do not merely exist in isolation but actively influence how individuals and institutions accept digital libraries as a formal field of academic study and professional training. When such barriers persist, the willingness of students to enroll, the ability of faculty to teach, and the commitment of institutions to invest in digital library education are all affected. T

Table 7 Hypothesis Statement

Hypothesis No.	Hypothesis Statement	Statistical Test Used	Key Results	Decision
H_1	H_{01}: There is no significant impact of digital library developments on the library and information environment in Jaipur. H_{11}: There is a significant impact of digital library developments on the library and information environment in Jaipur.	ANOVA	F = 19.860, Sig. = 0.000	H_{01} Rejected, H_{11} Accepted
H_2	H_{02}: There is no significant level of acceptance and application of digital libraries among institutions in Jaipur. H_{12}: There is a significant level of acceptance and application of digital libraries among institutions in Jaipur.	Regression	t = 6.631, Sig. = 0.000 R = 0.323, R^2 = 0.104	H_{02} Rejected, H_{12} Accepted

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H_3	H_{03}: There is no significant availability of opportunities for education and training in digital libraries in Jaipur. H_{13}: There is a significant availability of opportunities for education and training in digital libraries in Jaipur.	One-Sample t-test	t = 99.079, Sig. = 0.000 Mean = 4.0400	H_{03} Rejected, H_{13} Accepted
H_4	H_{04}: There is no significant influence of barriers on acceptance of digital libraries as an area of study. H_{14}: There is a significant influence of barriers on acceptance of digital libraries as an area of study.	ANOVA	F = 1.607, Sig. = 0.042	H_{04} Rejected, H_{14} Accepted

All four hypotheses tested in the study were found to be statistically significant. The ANOVA results for Hypothesis 1 showed a strong impact of digital library developments on the library and information environment. Regression results for Hypothesis 2 confirmed a significant level of acceptance and application of digital libraries among institutions in Jaipur. The one-sample t-test for Hypothesis 3 indicated substantial availability of opportunities for education and training in digital libraries. Lastly, ANOVA results for Hypothesis 4 revealed that barriers significantly influence the acceptance of digital libraries as an academic study area. Thus, all null hypotheses were rejected.

CONCSLUSION

The study revealed several important findings regarding digital library education and training in Jaipur. Digital library developments have significantly improved accessibility, user satisfaction, and the overall library environment. Institutions show a strong level of acceptance and active application of digital library systems. Opportunities for education and training—such as workshops, internships, and online resources—are widely available and positively perceived. However, several barriers persist, including limited awareness, insufficient infrastructure, outdated curriculum, lack of trained faculty, and financial constraints. These barriers meaningfully influence the acceptance of digital libraries as a study area. Overall, the study highlights both strong progress and areas needing improvement.

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1. The gender distribution shows that out of 380 respondents, 264 (69%) are male and 116 (31%) are female. This indicates a considerably higher participation of male respondents compared to females in the study. The imbalance may reflect existing trends in library and information science participation or institutional representation within Jaipur. The greater male presence could also influence the perspectives captured in the survey regarding digital library education and training.
2. The age-wise distribution reveals that respondents are primarily from the younger and middle-age categories. The largest group is 25–35 years (39%), followed by 36–45 years (31%). Both below 25 and 46–55 years share an equal representation of 13% each, while only 5% are above 55. This indicates that a majority of respondents are early-career or mid-career individuals actively engaged in digital library learning, usage, or professional activities.
3. The occupation data shows that students/learners form the majority with 287 respondents (76%), followed by librarians (13%) and faculty/teachers (12%). The high proportion of students reflects strong academic involvement in digital library education and training, while the participation of faculty and librarians ensures that the study includes both learners' and practitioners' perspectives, contributing to a comprehensive understanding of digital library adoption in Jaipur.
4. The educational qualification distribution indicates that Bachelor's degree holders form the largest group (58%), followed by Master's degree holders (30%), and M.Phil/Ph.D holders (13%). This suggests that most respondents are at the undergraduate or postgraduate level, which aligns with ongoing academic engagement in digital library-related courses, while a smaller representation from advanced researchers enriches the academic depth of the study.
5. Among faculty and professionals, 32% have 3–5 years of experience, making it the largest segment. This is followed by 28% with 0–2 years, and 20% each with 6–10 years and above 10 years of experience. This distribution reflects a balanced mix of early-career and experienced professionals, providing diverse insights into the practical and educational aspects of digital library developments in Jaipur.
6. A majority of respondents (67%) indicated that they are aware of the concept of a digital library, while 33% reported a lack of awareness. This shows that although most participants possess fundamental knowledge of digital libraries, a significant portion still requires exposure and orientation. This gap highlights the need for enhanced awareness programs to strengthen the acceptance and effective use of digital libraries.
7. The responses indicate strong agreement that digital libraries have enhanced access to learning and research materials. A combined 76% (44% strongly agree + 32% agree) believe digital libraries significantly improve accessibility. Only 13% are neutral, while 5% disagree and 8% strongly disagree. This reflects a strong positive perception and

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highlights that digital libraries are widely recognized as effective tools for overcoming traditional access barriers in academic environments.

FINDINGS PERTAINING TO HYPOTHESIS

Hypothesis 1: Impact of Digital Library Developments

- The ANOVA results (F = 19.860, Sig. = 0.000) show a statistically significant difference among respondent groups regarding the impact of digital library developments. Because the significance value is well below 0.05, the null hypothesis (H_{01}) is rejected. This confirms that digital library developments have a significant impact on the library and information environment in Jaipur. The findings indicate improvements in accessibility, user satisfaction, operational efficiency, and modernization of traditional library practices due to digital transformation.

Hypothesis 2: Acceptance and Application of Digital Libraries

- The regression analysis shows a strong significant relationship between acceptance and application of digital libraries (t = 6.631, Sig. = 0.000). The model explains about 10.4% of the variance ($R^2 = 0.104$), which is meaningful in social science research. Since the p-value is below 0.05, the null hypothesis (H_{02}) is rejected. This means that institutions in Jaipur have a significant level of acceptance and practical application of digital libraries, as supported by active use of digital platforms and positive perceptions of digital library integration.

Hypothesis 3: Availability of Opportunities for Training

- The one-sample t-test shows a very high t-value (99.079) with a significance level of 0.000, confirming that the mean perception (4.0400) is significantly higher than the neutral value. This leads to rejection of the null hypothesis (H_{03}). Thus, the study concludes that Jaipur has significant opportunities for education and training in digital libraries, including workshops, seminars, internships, online tutorials, and access to hands-on digital library labs.

Hypothesis 4: Influence of Barriers on Acceptance

The ANOVA test for barriers shows a significance value of 0.042, which is below 0.05, indicating that the differences in responses across groups are statistically significant. Therefore, the null hypothesis (H_{04}) is rejected. This confirms that barriers—such as lack of awareness, limited infrastructure, insufficient trained faculty, outdated curriculum, financial constraints, and resistance to change—significantly influence the acceptance of digital libraries as an academic and training discipline in Jaipur.

5.2 SUGGESTION OF THE STUDY

Based on the findings of the present research, several important suggestions have emerged to strengthen digital library education and training in Jaipur. The suggestions are categorized into

academic, institutional, technological, policy-related, and student-centric recommendations to promote a more effective, accessible, and future-ready digital library ecosystem. These recommendations aim to address the identified gaps and barriers while enhancing the opportunities already available.

One of the foremost suggestions is the need to significantly upgrade digital library infrastructure in educational institutions in Jaipur. Many respondents highlighted issues such as inadequate hardware, slow internet speed, lack of licensed digital tools, and limited access to digital library labs. Institutions must therefore invest in high-speed broadband connections, robust servers, modern digital library management software, and cloud-based systems. These technological improvements will ensure that students and faculty can efficiently access digital resources, participate in training sessions, and engage in collaborative online activities. Additionally, institutions should establish dedicated digital library labs equipped with up-to-date computers and high-quality scanning and digitization tools to support hands-on learning.

The study indicates that although digital library concepts are included in the curriculum, they are often limited, outdated, or insufficiently detailed. Therefore, it is recommended that universities and LIS departments revise the curriculum to incorporate emerging topics such as digital preservation, metadata standards, artificial intelligence in libraries, cloud-based library systems, blockchain technology, digital rights management, and advanced information retrieval techniques. Practical components must be increased, allowing students to gain real-time exposure to digital library environments. Curriculum updates should be conducted in consultation with industry professionals, digital librarians, technology experts, and academic specialists to ensure relevance and applicability in modern library settings.

The research reveals that lack of adequately trained faculty is a major barrier to digital library education. Hence, institutions must prioritize continuous professional development for teachers. Faculty should be encouraged and supported to attend national and international workshops, seminars, conferences, and training programs related to digital technologies, software tools, and digital library management. Universities should also collaborate with premier institutions such as INFLIBNET, NISCAIR, and the National Digital Library of India (NDLI) to organize targeted training programs. Faculty exchange programs and joint research initiatives with experts in digital librarianship can further strengthen faculty competency and confidence in teaching digital library subjects.

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