

## Original Article

# Assessment of the Effectiveness of Digital Library Platforms in Higher and Technical Education Institutions of the Marathwada Region

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*The rapid integration of digital library platforms into higher and technical education has significantly transformed academic information access, research support, and learning practices. This study evaluates the effectiveness of digital library platforms across higher and technical education institutions in the Marathwada region of Maharashtra. The assessment focuses on usability, accessibility, user satisfaction, content relevance, and the extent to which these platforms enhance learning and research productivity. Data were collected from students, faculty members, and librarians across selected institutions using structured questionnaires and interviews. The study reveals that although digital libraries have improved information access and academic engagement, challenges such as intermittent internet connectivity, limited digital literacy, and underutilization of advanced features persist. The findings suggest the need for capacity-building programmers, infrastructure strengthening, and better awareness mechanisms for optimal utilization of digital library resources.*

**Keywords:** Digital Libraries; Higher Education; Technical Education; Marathwada Region; User Satisfaction; E-resources; Information Access; Research Support; NDLI; ICT in Education.

## Introduction

The rapid advancement of Information and Communication Technologies (ICTs) has transformed the landscape of academic libraries across the world. Digital library platforms have emerged as essential components of modern higher and technical education systems, providing seamless access to electronic resources such as e-books, digital journals, multimedia content, databases, theses, and open educational materials. These platforms support flexible, self-paced, and remote learning environments, thereby enhancing academic productivity and research efficiency. In India, initiatives such as the *National Digital Library of India (NDLI)*, *e-ShodhSindhu*, *DELNET*, and various institutional repositories have played a critical role in the digital transformation of academic libraries. Higher and technical education institutions increasingly rely on these digital infrastructures to meet the diverse information needs of students, researchers, and faculty members. As institutions move towards digital ecosystems, evaluating the effectiveness of digital library platforms becomes essential to ensure the quality, accessibility, and relevance of information services.

The Marathwada region of Maharashtra comprising Chh.Sambhajinagar, Jalna, Parbhani, Hingoli, Beed, Latur, Dharashiv and Nanded has witnessed significant expansion in higher and technical education during the past decade. With this expansion, libraries in the region have adopted various digital platforms to strengthen teaching, learning, and research support. However, despite technological adoption, variations in ICT infrastructure, digital literacy levels, and awareness of digital resources pose challenges to effective utilization. Assessing the effectiveness of digital library platforms in this specific regional context is therefore crucial. The evaluation helps determine how well these platforms meet user expectations, how efficiently they support academic activities, and what challenges limit their optimal use. Such assessment also provides valuable insights for institutional policymakers, librarians, and educators to improve digital library services.



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The present study seeks to systematically examine the usability, accessibility, user satisfaction, and academic impact of digital library platforms in higher and technical education institutions in the Marathwada region. The study further explores key challenges and proposes strategies to enhance digital library effectiveness in the evolving academic environment.

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## Objectives of the Study

Digital library platforms are increasingly integrated into academic environments, yet their actual effectiveness varies depending on institutional infrastructure, user awareness, and the quality of digital resources provided. To obtain a comprehensive understanding of how these platforms function within higher and technical education institutions in the Marathwada region, the study outlines the following specific objectives:

- To assess the usability, accessibility, and user satisfaction of digital library platforms in higher and technical education institutions of Marathwada.
- To analyze the extent to which digital library platforms support teaching, learning, and research activities.
- To examine challenges faced by users while accessing digital library resources.
- To provide recommendations for enhancing the effectiveness of digital library services.

## Methodology

The present study adopts a descriptive and survey-based research design to assess the effectiveness of digital library platforms in higher and technical education institutions of the Marathwada region. This methodology enables systematic collection, analysis, and interpretation of data related to user experience, accessibility, satisfaction, and institutional practices associated with digital library usage.

## 1 Research Design

The present study adopts a descriptive survey research design, which is most suitable for examining user perceptions, experiences, and effectiveness of digital library platforms across multiple academic institutions. This design enables the researcher to gather quantitative as well as qualitative data from a diverse group of user's students, faculty members, and librarians—who regularly interact with digital library services.

A descriptive survey approach allows for systematic measurement of variables such as usability, accessibility, satisfaction, content relevance, and institutional ICT support. It also facilitates comparison between different categories of users and institutions within the Marathwada region. Through structured questionnaires, interviews, and institutional document analysis, the design helps in capturing both the breadth and depth of digital library usage.

This research design is particularly appropriate for service evaluation studies, as it supports objective assessment of existing practices, identifies gaps and challenges, and provides evidence-based insights for improving digital library effectiveness in higher and technical education institutions.

## 2 Universe and Sampling

The universe of the study comprises all higher and technical education institutions situated in the eight districts of the Marathwada region, namely Chh.Sambhajinagar, Jalna, Parbhani, Hingoli, Beed, Latur, Dharashiv and Nanded. These institutions include universities, engineering colleges, polytechnic institutes, and arts, commerce, science colleges that provide access to digital library platforms for academic purposes.

To ensure adequate representation of different types of institutions and user groups, a multi-stage sampling method was adopted. In the first stage, institutions were selected using stratified sampling, ensuring that both higher education and technical institutions were proportionally represented across the region. In the second stage, purposive sampling was used to select respondents who actively engage with digital library platforms.

## 3 Data Collection Tools

To collect accurate and comprehensive data for assessing the effectiveness of digital library platforms, the study employed a combination of quantitative and qualitative data collection tools. A structured questionnaire based on a five-point Likert scale was used as the primary instrument for gathering responses from students and faculty members. The questionnaire included items related to usability, accessibility, content relevance, user satisfaction, digital literacy, and challenges experienced while using digital library platforms. In addition to this, semi-structured interviews were conducted with librarians to obtain deeper insights into institutional digital library practices, ICT infrastructure, subscription patterns, and user support activities. To complement the survey and interview data, institutional document analysis was carried out, which involved reviewing annual library reports, usage statistics, subscription lists, and ICT facility records. The combination of these tools ensured triangulation of data, enhanced the validity of findings, and provided a well-rounded understanding of digital library usage across higher and technical education institutions in the Marathwada region.

## Review of Literature

Digital libraries have emerged as an integral part of modern academic ecosystems, providing ubiquitous access to scholarly communication, research materials, and learning resources. Marchionini defines digital libraries as “organized collections of digital information supported by services that assist users in dealing with information” and emphasizes their central role in learning and research environments (Marchionini 15). These platforms not only enhance access but also expand the pedagogical scope of higher education institutions.

Reitz highlights that digital libraries break traditional barriers of time and space, offering users the flexibility to retrieve information regardless of physical location (Reitz 42). This shift has encouraged institutions to adopt digital platforms that integrate advanced search tools, metadata, multimedia resources, and user-friendly interfaces. Similarly, Chowdhury argues that digital libraries serve as comprehensive knowledge infrastructures that rely heavily on ICT, interoperability, and effective content management to meet the evolving needs of academic communities (Chowdhury 81).

Studies conducted in the Indian context also provide valuable insights. Singh and Kaur report that digital libraries in India are expanding rapidly but still face challenges such as insufficient training, low awareness of e-resources, and variable ICT infrastructure across institutions (Singh and Kaur 57). Their research underscores the need for capacity-building initiatives and technological enhancements. Islam and Tsuji, in their evaluation of university digital libraries, note that user satisfaction is strongly influenced by system reliability, content relevance, and user literacy levels (Islam and Tsuji 118). They argue that digital literacy training significantly improves users’ ability to make effective use of digital resources.

Tenopir and King identify that faculty members value digital library platforms primarily for their convenience, extensive information coverage, and positive impact on research productivity (Tenopir and King 24). Studies by Khan et al. emphasize that students increasingly depend on digital resources for academic assignments, exam preparation, and project work, particularly in technical education institutions (Khan et al. 210). However, issues such as limited bandwidth, lack of user awareness, and inadequate training often hinder effective utilization.

The review of literature highlights that digital library platforms have significantly transformed academic environments by improving access, supporting research, and enhancing learning. Yet, effective usage depends on several factors, including ICT infrastructure, usability, digital literacy, and institutional support. These studies collectively indicate the need for regular evaluation of digital library platforms to ensure that institutions meet the diverse and growing expectations of academic users.

## Findings and Analysis

The data collected from students, faculty members, and librarians across higher and technical education institutions in the Marathwada region were analyzed to assess the effectiveness of digital library platforms. The major findings are presented fewer than five key dimensions: usability, content relevance, user satisfaction, infrastructure, and digital literacy.

## 1 Usability and Ease of Access

Most respondents indicated that digital library platforms are moderately easy to use.

**Table 1: Usability and Ease of Access**

Usability Parameters	Students (%)	Faculty (%)	Librarians (%)
Easy to navigate interface	62%	71%	85%
Simple login and access process	68%	76%	90%
Availability of help/support options	55%	63%	78%
Accessibility across multiple devices	60%	73%	82%
Overall ease of use	64%	70%	88%

Most faculty and librarians find digital platforms easy to use, while students show moderate ease of access, indicating a need for more training and orientation. Reported that they could access the platforms without difficulty. This indicates that librarians are most proficient, whereas students still require training and awareness programmes to improve digital skills.

## 2 Content Relevance and Availability

A considerable portion of users expressed satisfaction with the relevance of digital resources.

**Table 2: Content Relevance and Availability**

Content Parameters	Students (%)	Faculty (%)	Librarians (%)
Availability of course-related materials	58%	72%	88%
Relevance of e-journals and databases	61%	75%	84%
Adequacy of e-books and study resources	63%	69%	80%
Coverage of multidisciplinary content	57%	68%	79%
Timeliness and updating of content	49%	62%	74%

Faculty members derive the highest utility from available content, while students indicate limited awareness of relevant resources. Felt that available e-resources supported their academic requirements. Librarians (85%) also reported that content collections are aligned with curriculum and research needs. However, many students noted gaps in subject-specific e-journals and technical databases.

## 3 User Satisfaction Levels

User satisfaction was generally positive but varied across categories.

**Table 3: User Satisfaction Levels**

Satisfaction Indicators	Students (%)	Faculty (%)	Librarians (%)
Satisfaction with access speed	52%	60%	70%
Satisfaction with search features	59%	67%	82%
Satisfaction with overall user experience	61%	70%	88%
Satisfaction with availability of support	48%	58%	76%
Overall satisfaction level	56%	68%	85%

Faculty members showed higher satisfaction (70%) compared to students (61%), indicating greater familiarity with digital tools. Librarians (88%) rated the platforms most favorably due to their resource management expertise. Overall satisfaction suggests that digital libraries effectively support basic information needs but advanced features remain underutilized. Librarians show the highest satisfaction due to better familiarity with systems; students show modest satisfaction.

## 4 Infrastructure and Connectivity Issues

Internet speed and ICT infrastructure emerged as major barriers.

**Table 4: Infrastructure and Connectivity Issues**

Infrastructure Issues	Students (%)	Faculty (%)
Slow or inconsistent internet connectivity	55%	48%
Limited access to computers/devices	42%	30%
Insufficient Wi-Fi coverage on campus	47%	38%
Lack of updated library ICT equipment	40%	25%
Server downtime or access disruptions	34%	22%

54% of students and 47% of faculty reported frequent connectivity issues while accessing digital resources. Many institutions lack high-speed Wi-Fi, especially in rural areas of the Marathwada region. Connectivity remains the most significant issue affecting digital library usage among students and faculty.

## 5 Awareness and Digital Literacy

**Table 5: Awareness and Digital Literacy**

Awareness and Literacy Parameters	Students (%)	Faculty (%)
<b>Awareness of available digital library tools</b>	52%	70%
<b>Ability to use advanced search techniques</b>	41%	63%
<b>Participation in training/orientation</b>	35%	48%
<b>Confidence in using digital resources</b>	45%	67%
<b>Need for further digital literacy training</b>	68%	54%

Nearly half of the student respondents stated that they were not fully aware of all available digital library resources and services. This indicates a need for orientation programmers, user training, and promotional activities such as NDLI Club workshops and library awareness events. Digital literacy is comparatively lower among students, with a clear need for systematic awareness and training programmers.

## 6 User Satisfaction with Digital Library Platforms

**Table 6: User Satisfaction with Digital Library Platforms**

Parameter	Students (%)	Faculty (%)	Librarians (%)
<b>Ease of Access</b>	68%	74%	90%
<b>Content Relevance</b>	61%	72%	85%
<b>Interface Usability</b>	59%	67%	80%
<b>Speed &amp; Connectivity</b>	52%	58%	65%
<b>Support for Research &amp; Learning</b>	64%	76%	88%

Above Table indicates that overall user satisfaction with digital library platforms varies across different user group's students, faculty, and librarians. Librarians consistently report the highest levels of satisfaction across all parameters, reflecting their strong familiarity with digital tools, better understanding of resource access, and regular professional engagement with library systems. Faculty members also show comparatively high satisfaction, particularly in terms of content relevance (72%) and support for research and learning (76%), suggesting that digital libraries effectively meet their teaching and research needs. In contrast, students record the lowest satisfaction levels in almost all categories. Their lower scores in interface usability (59%) and speed/connectivity (52%) reveal that technological barriers and limited digital skills may hinder their ability to fully utilize digital resources. Despite these challenges, more than half of the students acknowledge that digital libraries provide beneficial academic support (64%). Overall, the interpretation highlights a clear gap between students and other user groups, indicating the need for improved user training, enhanced infrastructure, and more student-centric awareness programmers.

## 7 Challenges Faced by Users-

**Table 7: Challenges Faced by Users**

Challenges	Students (%)	Faculty (%)
<b>Poor Internet Connectivity</b>	54%	47%
<b>Lack of Awareness about Available Resources</b>	49%	30%
<b>Limited Digital Skills</b>	38%	22%
<b>Difficulty in Using Advanced Search Tools</b>	41%	28%
<b>Inadequate Institutional ICT Infrastructure</b>	36%	25%

Table 5.7 highlights the key challenges encountered by students and faculty members while using digital library platforms in higher and technical education institutions of the Marathwada region. The data clearly indicate that poor internet connectivity is the most significant barrier, affecting 54% of students and 47% of faculty members. This suggests that inconsistent network availability and insufficient bandwidth continue to hamper seamless access to digital resources, particularly in institutions located in semi-urban and rural areas.

A notable proportion of students (49%) reported a lack of awareness about available digital resources, which indicates inadequate user orientation and promotional activities by institutions. Comparatively, faculty members (30%) reported fewer awareness-related issues, reflecting their greater familiarity with academic databases and e-resources.

The challenge of limited digital skills affects students (38%) more than faculty (22%), demonstrating that students require targeted digital literacy programmers to effectively navigate search tools, databases, and digital platforms. Similarly, difficulty in using advanced search tools was higher among students (41%), indicating that many users rely only on basic search features and are unaware of efficient retrieval techniques.

A considerable number of respondents have highlighted issues related to inadequate ICT infrastructure, with 36% of students and 25% of faculty experiencing constraints such as outdated systems, limited access terminals, or insufficient Wi-Fi coverage. These findings collectively suggest that infrastructural gaps, inadequate awareness, and digital skill limitations significantly affect the effective utilization of digital library platforms in the region.

## Discussion

The findings of the study indicate that digital library platforms play a significant role in supporting academic activities across higher and technical education institutions in the Marathwada region. However, the degree of effectiveness varies among different user groups due to disparities in digital literacy, awareness, and institutional infrastructure. The discussion highlights critical dimensions that influence the actual utilization and impact of digital library platforms. The notable difference in satisfaction levels among users where librarians show the highest satisfaction, followed by faculty and then students reveals an evident digital proficiency gap. Librarians, being professionally trained in handling digital systems, exhibit greater ease of access and utilization. Faculty members also benefit from regular academic engagement with digital resources. However, students lag behind, indicating the need for structured orientation programmers and digital literacy initiatives to improve their ability to navigate and effectively use digital platforms. Although the content relevance and academic usefulness of digital library resources are acknowledged positively by most users, the findings also highlight gaps in subject-specific databases and advanced search functionalities. Particularly in technical and engineering disciplines, students reported limited availability of specialized e-resources, which affects their research depth. This suggests that institutions must evaluate their subscription policies and ensure that digital collections align closely with academic programmers and research priorities. Thirdly, the study underscores persistent infrastructural barriers, especially poor internet connectivity and inadequate ICT facilities. More than half of the students reported difficulties due to slow or unstable internet connections, which significantly hinder seamless access to digital resources. This challenge is pronounced in rural or semi-urban institutions of the Marathwada region, reflecting a broader digital divide that affects academic equity. Addressing these infrastructural limitations is crucial for improving overall user satisfaction and digital library effectiveness.

The analysis reveals a substantial lack of awareness among students regarding the range of available digital library services. This not only limits their usage but also results in underutilization of valuable academic resources. Institutions must therefore adopt proactive measures such as NDLI Club activities, user training, information literacy sessions, and regular promotional events to enhance visibility and awareness of digital library services. Finally, the findings suggest that digital library platforms have strong potential to enhance teaching, learning, and research, but their impact remains constrained by gaps in awareness, skills, and infrastructure. A comprehensive institutional strategy combining capacity building, resource enhancement, and infrastructural development is essential to fully realize the benefits of digital libraries in the region. The discussion reinforces that while digital library platforms have been widely adopted in higher and technical institutions of Marathwada, their effectiveness depends on continuous evaluation, user-centric improvements, and robust support systems. Addressing the identified challenges will significantly improve academic outcomes and strengthen the digital learning ecosystem.

## Conclusion

The present study assessed the effectiveness of digital library platforms in higher and technical education institutions across the Marathwada region and revealed both positive impacts and persistent challenges. The findings demonstrate that digital libraries have significantly enhanced access to academic information, supported research activities, and facilitated flexible learning for diverse user groups. Faculty members and librarians benefit the most from digital platforms due to their higher levels of digital proficiency and awareness of available resources.

Students exhibit comparatively low satisfaction levels, primarily due to limited digital literacy, inadequate awareness of digital services, and difficulty in using advanced search tools. Challenges such as poor internet connectivity, insufficient ICT infrastructure, and gaps in subject-specific digital resources further restrict the optimal utilization of digital libraries. These limitations highlight that despite institutional efforts to integrate digital platforms, substantial improvements are needed to maximize their academic value.

The study concludes that digital library platforms possess strong potential to strengthen academic engagement, research productivity, and overall learning outcomes in the Marathwada region. To fully harness this potential, institutions must focus on improving digital literacy training, enhancing awareness initiatives, upgrading technological infrastructure, and expanding access to high-quality digital resources. Continuous evaluation and user feedback should form an integral part of digital library management to ensure effective, user-centric, and sustainable digital library services.

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