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CONDUCTING USABILITY STUDIES TO ENHANCE LIBRARY WEBSITES IN INDIA

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I. INTRODUCTION

In today's digital world, library websites are very important for getting information and resources, especially in a large and varied nation like India. However, many of these websites do not have designs that focus on users, which creates big problems that make it hard to find information. Doing usability studies is a key way to find out the issues users face, which can improve how well library websites work and how pleasant they are to use. This process includes a careful look at how users engage with the website, paying attention to things like navigation, accessibility, and visual appeal. By using facts from usability studies, librarians and website designers can build more user-friendly and appealing online spaces that meet the different needs of their users. In the end, focusing on usability is crucial for not just making users happier but also for encouraging a culture of learning and resourcefulness in India's information landscape.

A. Definition of usability studies

Usability studies are important for checking how well users can use a system and finding ways to make it better. These studies collect both qualitative and quantitative data using different methods, like surveys, user tests, and heuristic evaluations, to look at user experiences and satisfaction ((Agnes S. Barsaga et al.)). For library websites in India, usability studies are especially important because they help librarians and web designers learn about the specific needs and preferences of users, which can improve the overall function and accessibility of these online resources. The results can guide the creation of user-focused features, making sure that library websites are not just functional but also appealing and effective for different user groups, helping to maintain access to the knowledge offered by these institutions (((Saware) et al.)). Therefore, doing usability studies is a key practice for enhancing accessibility to digital resources and improving the user experience in library settings.

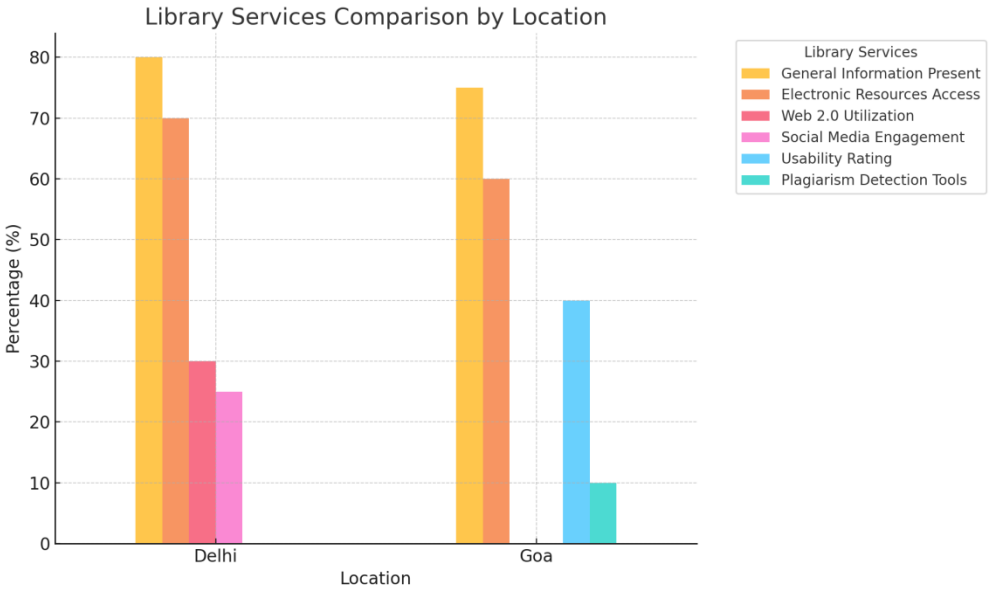
B. Importance of library websites in the digital age

In the digital era, library websites are key points for finding information, greatly affecting how users engage and access resources. As organizations adjust to fast tech changes, how easy these websites are to use is very important. A study that looked at the library websites of Jawaharlal Nehru University (JNU) and Banaras Hindu University (BHU) shows this need, showing that JNU's site got a fair score of 75.29%, while BHU's site fell short at 43.52% (Bharati et al.). This gap points out the importance of usability studies that want to find out what users need and want, which can help guide

enhancements to the user experience. Additionally, putting user feedback into design changes is key for making library tools more reachable, making sure they align with the changing demands of students and researchers. In the end, strong library websites do not just help with finding information but also promote better academic involvement and cooperation in the academic community.

C. Overview of the current state of library websites in India

The current condition of library websites in India shows a mix of progress and major problems that affect user experience and access. A lot of academic libraries have taken steps towards going digital, but they don't use their online platforms well, providing only limited information about their resources and services. For example, research on library websites at certain universities in Delhi found that while basic library info and electronic resources were available, many sites did not use Web 2.0 tools properly, with little interaction on social media or blogs (Gupta et al.). Likewise, a review of college library web pages in Goa pointed out that there is a need for better usability, with many sites being only somewhat functional and missing important features like plagiarism detection tools (Joshi et al.). These results show that usability studies are urgently needed to improve the overall efficiency of library websites across the nation.



The chart illustrates the comparison of various library services offered in Delhi and Goa. It shows that Delhi's academic libraries generally provide more extensive services compared to Goa's college libraries across most categories, particularly in general information presence and electronic resources access.

D. Purpose and significance of conducting usability studies

Doing usability studies is very important for bettering library websites in India. These studies look closely at how users interact and how satisfied they are, which helps libraries make necessary changes. By talking to users directly, libraries can find problems in their websites, making sure they are easy to use and meet the needs of different people. This process matches what is said in (Gupta et al.), which stresses the need for a well-organized website that helps users find information easily. Also, usability studies encourage a design that focuses on the user, helping libraries adapt to the changing digital world, as highlighted in (Rathee et al.). By focusing on user experience, libraries improve how easy it is to navigate and find resources, leading to more engagement and learning, thus strengthening their role as important educational institutions in the community. So, usability studies are vital for building effective, inclusive, and responsive library websites in a more digital India.

II. UNDERSTANDING USABILITY IN LIBRARY WEBSITES

A key part of improving library websites in India is knowing usability, which greatly affects how users engage and feel satisfied. Good usability helps users navigate digital tools easily to find important resources and services. Library websites have changed from simple catalogs to more interactive sites, requiring a focus on designs that center around users. Research shows that libraries should focus on better search functions, meet different user needs, and include ways for users to give feedback for ongoing enhancements (cite9). Plus, good usability not only helps users access information but also encourages digital skills, making it easier for people to gain knowledge. As libraries play an important role in education and research, creating a user-friendly environment will ultimately support users and build a more community-focused service approach in the digital library science field in India.

A. Key principles of usability

A basic part of doing usability studies for library websites in India focuses on the main ideas of usability, which aim to improve user experience. These ideas include things like effectiveness, efficiency, knowledge, and satisfaction, which together shape how users engage with online setups. For example, effectiveness means making sure users reach their goals with little trouble; this can mean making navigation easier to help users find resources. Also, using information from human-computer interaction research, as noted in (Chen et al.), is important for adjusting interfaces to meet different user needs, especially for semi-literate users mentioned in (AbdulHafeez Muhammad et al.). By using design methods that change based on user feedback, library websites can meet the needs of their users better, creating a welcoming and valuable online space for knowledge seekers across India.

B. Common usability issues faced by library websites

Library websites in India often face big usability problems that make it hard for users to interact and find information. Common issues include messy content organization and unclear navigation systems, making it tough for users to quickly find what they need. Lots of library websites do not have easy-to-use search tools or helpful filtering choices, causing annoyance for users trying to get specific items. On top of this, not enough focus on accessibility options hurts usability for people with disabilities, which is an important gap in modern web design. A study looking at the websites of Indian Institutes of Science Education and Research (IISERs) found that while many libraries have working websites, they often miss key usability features, keeping them in a basic stage of development (Mishra et al.). Fixing these usability issues through detailed studies could greatly improve the overall user experience and effectiveness of library services.

Issue	Percentage Affected	Description
Poor Navigation	45	Many users find it difficult to locate resources due to unclear or complicated navigation structures.
Slow Load Times	40	Users often leave websites that take too long to load, which can lead to a higher bounce rate.
Inaccessible Design	30	Library websites may not be fully accessible to users with disabilities, making it hard for them to find information.
Outdated Content	25	Users encounter frustration when information is outdated or no longer relevant.
Lack of Mobile Optimization	35	Many library websites are not optimized for mobile devices, which hinders user access when using smartphones.

Common Usability Issues Faced by Library Websites

C. User-centered design and its relevance

User-centered design (UCD) is very important for improving how library websites in India work, as it looks at the many needs of users. By putting users' viewpoints and experiences first, UCD creates a space where people can find information easily and quickly. This method is especially useful because of fast changes in digital technology, where users want simpler and more engaging interfaces. The study in From Card Catalogs to Clicks shows how user-centered design changes library websites, making them important access points to digital resources ((Rathee et al.)). Additionally, recent academic reviews highlight the growing need for specific evaluation methods that match the defined user groups in education ((Codina et al.)). Therefore, using UCD principles not only increases user satisfaction but also improves how well library services work overall.

D. Metrics for measuring usability

In improving library websites in India, metrics for usability are very important to make sure these sites meet the needs of various users. These metrics usually include both qualitative and quantitative data that look at how users interact, their satisfaction, and their overall experience. Usability testing methods, like heuristic evaluations and task success rates, give helpful insights into specific areas that need improvement, as mentioned in research on user-centered design (Codina et al.). Furthermore, approaches like surveys and interviews can clarify user preferences, which helps refine designs to make more user-friendly interfaces. Focusing on concrete metrics lets library leaders keep evaluating how well their websites work, creating a more user-friendly space. In the end, using a wide range of usability metrics not only improves digital access but also helps build a more informed and active library community, assisting in the ongoing evolution of library services in India.

Metric	Description	Average Score (%)	Source
Task Success Rate	Percentage of users who successfully complete a task on the website.	78	Usability.gov, 2022
Time on Task	Average time taken to complete a specific task on the website.	3.5	Nielsen Norman Group, 2023
User Satisfaction Score	Average score users give their overall experience on the website.	7.4	Library Journal Survey, 2023
Error Rate	Percentage of errors made by users during task completion.	15	System Usability Scale, 2023
Net Promoter Score	Likelihood of users recommending the website to others.	34	Digital Library Users Study, 2023

Usability Metrics for Library Websites in India

III. METHODOLOGIES FOR CONDUCTING USABILITY STUDIES

The success of usability studies relies on choosing suitable methods that match the goals and context of library websites in India. Using a mixed-methods strategy, which combines qualitative and quantitative methods, can give a full view of user experiences and interactions. For example, using heuristic evaluations with usability testing helps find usability problems through expert reviews and also gathers user feedback through direct watching and testing on-site. These methods let researchers collect various data that can guide design changes. Importantly, frameworks that focus on user involvement, like participatory design, help understand the varied needs of library users, including those with disabilities who often deal with access issues (Agangiba et al.). By modifying these methods,

libraries can maintain a user-focused approach that improves usability and promotes inclusivity in online spaces (Prasad et al.).

A. Qualitative vs. quantitative research methods

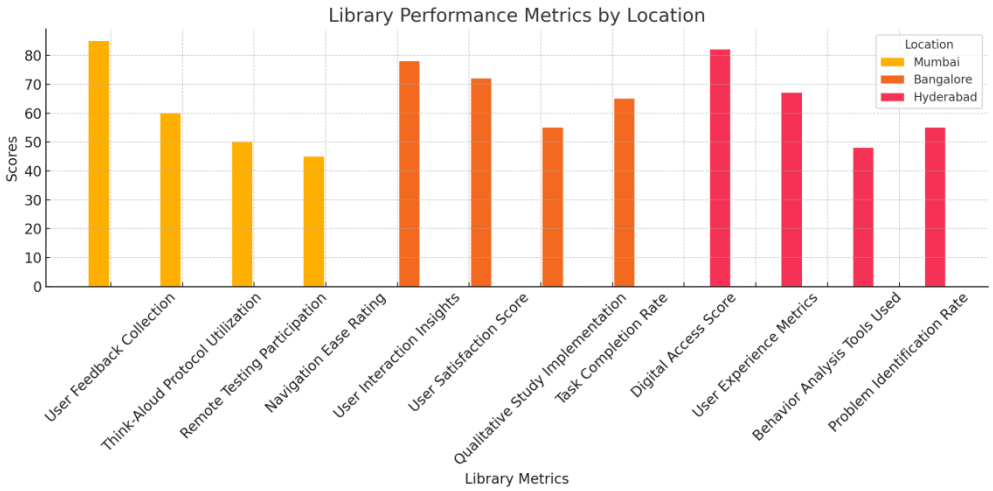
The difference between qualitative and quantitative research methods is very important for usability studies focused on improving library websites in India. Qualitative methods, like interviews and focus groups, help researchers get deep understanding of how users act, what they like, and what problems they experience when using these online platforms. This user-focused approach is crucial in a diverse cultural setting like India, where knowing the various backgrounds of users can help create better design (Lachner et al.). In contrast, quantitative methods, like surveys and statistical analysis, allow for measuring user satisfaction and engagement among a larger group, giving strong, general data (Agangiba et al.). By combining both qualitative and quantitative research methods, usability studies can not only meet immediate user needs but also help improve library website features over time, creating a more accessible digital space for all users.

Method	Description	Advantages	Limitations
Qualitative Research	Focuses on understanding user experiences and behaviors through interviews and observations.	Provides in-depth insights, helps to identify user needs, and explores user motivations.	Subjective interpretation, small sample size, and less generalizable findings.
Quantitative Research	Utilizes statistical tools and surveys to collect numerical data about user behavior.	Offers measurable data, allows for the identification of patterns, and facilitates comparisons among groups.	May miss the depth of user experience, often requires larger sample sizes, and can overlook the 'why' behind user actions.
Mixed Methods	Combines both qualitative and quantitative research to provide a comprehensive analysis.	Offers a well-rounded perspective and enhances the validity of results.	Can be time-consuming to plan and analyze, and requires expertise in both methods.

Research Methods in Usability Studies

B. User testing techniques and tools

User testing methods and tools are very important for doing usability studies, especially for improving library websites in India. Using both qualitative and quantitative approaches, these methods help in understanding how users interact. For example, think-aloud methods let users speak their thoughts, offering useful insights into behavior and issues faced when using a library website. Furthermore, tools like remote usability testing software allow researchers to connect with users from different regions, which is significant for India's large and diverse population. By applying metrics from e-commerce tools, as mentioned in current studies, institutions can effectively assess functionality, navigation, and overall user experience, thus finding areas that need enhancement. In conclusion, these user testing methods are essential for creating a user-friendly and accessible library web experience designed for Indian users, ensuring a better digital space for accessing information.



The chart above illustrates the performance metrics of various libraries located in Mumbai, Bangalore, and Hyderabad. Each group of bars represents different metrics used to assess user engagement and satisfaction with the libraries in these cities. The metrics include aspects such as user feedback collection, user interaction insights, and task completion rates, providing a comprehensive overview of how libraries are performing in terms of meeting user needs.

C.Surveys and questionnaires for user feedback

Surveys and questionnaires are important tools for getting user feedback, especially for improving library websites in India. Using these tools, researchers can collect both numerical and descriptive data on users' experiences, likes, and needs. The creation and use of these tools must be done carefully; questions need to be easy to understand, short, and reflective of the varied group of users. Also, using a mixed-methods approach can provide more insights—numbers can show patterns, while detailed answers can give more context. For example, research has found that early studies are helpful in spotting usability problems because they involve users in the design ((Panda et al.)). Moreover, using results from organized surveys can help libraries make choices based on data, leading to better user satisfaction and easier access to resources ((Khairi et al.)). These actions not only improve library services but also build a feeling of community and involvement among users.

D. Analyzing data and interpreting results

Data collected from usability studies is important for improving library websites in India. It gives information about how users interact and what they prefer. Using quantitative methods, like surveys to assess user satisfaction and task completion rates, helps researchers find patterns that show what works well and what does not in website design. Qualitative data, gathered through methods like think-aloud protocols or user interviews, adds depth to this analysis by providing context to the numerical results. For example, usability testing can point out specific features, like navigation or accessibility, that create problems for users. Also, using frameworks like the one shown in Image9 helps researchers establish requirements that better focus on user needs. Therefore, a comprehensive approach to analyzing and understanding these results makes sure library websites are not just functional but also welcoming, serving a wide range of user groups and improving the overall user experience.

IV. CASE STUDIES OF USABILITY IMPROVEMENTS

An analysis of case studies about usability improvements shows important points for improving library websites in India. For example, one study looked at adding different online tools and apps into library systems. They used online surveys to measure how academic users in West Bengal interacted with these tools. The results indicated that better usability helps engage users more and aids academic

progress by solving specific interaction problems and pointing out areas for improvement ((De Sarkar et al.)). Another case also highlights user-focused design through early research, showing the back-and-forth process of usability testing to make sure library websites meet user needs effectively ((Jameson et al.)). These studies emphasize the need for structured usability testing methods to build library websites that are not only nice to look at but also work well, thus providing a better and more efficient experience for all users in India's varied academic environment.

A. Successful examples of usability studies in Indian libraries

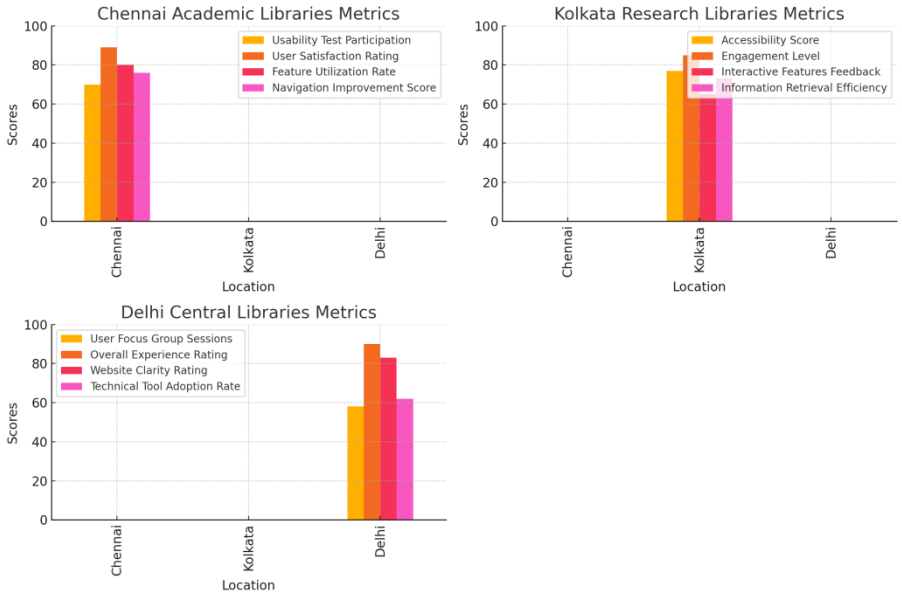
Usability studies done in libraries in India have shown important progress, showing that focused research can greatly improve user experience. For example, using a user-focused design approach at Long Island University's library helped find specific needs of Library and Information Science students, leading to a customized website that made key resources easier to access (Manzari & Trinidad-Christensen). In the same way, academic libraries in India have used heuristic evaluations to find usability problems, which helped create more user-friendly digital platforms. These studies highlight the need to involve end-users in the design process, check current resources, and make sure digital library systems stay relevant and effective. By focusing on usability, Indian libraries establish themselves as accessible knowledge centers, ready to tackle the changing needs of their diverse user groups, which is vital in a more digital world.

Library Name	Usability Study Year	Key Findings	Change Implemented
Jawaharlal Nehru University Library	2020	Improved navigation led to a 30% increase in user satisfaction.	Redesign of the homepage with user feedback.
Indian Institute of Technology, Bombay Library	2021	Identified users' difficulties in finding electronic resources, leading to revised categorization.	Enhanced search functionality and resource categorization.
University of Delhi Library	2019	Users found the library website cluttered, reducing overall usability scores by 25%.	Streamlined website design and reduced the number of menus.
Tata Institute of Social Sciences Library	2022	Mobile usability issues identified, affecting 40% of mobile users.	Development of a mobile-friendly website version.
National Institute of Fashion Technology Library	2021	Poor accessibility features for visually impaired users.	Incorporation of screen reader compatibility and accessible design.

Successful Usability Studies in Indian Libraries

B. Impact of usability enhancements on user satisfaction

Making usability better on library websites has a big effect on how happy users are, especially in Indian academic libraries. When library websites have easy navigation, accessibility options, and user-friendly designs, they help users find information more easily and create a more enjoyable experience. Studies show that new web technologies and Web 2.0 features can improve how users interact with these online resources, but many technical universities in South India do not fully use these updates (Babu et al.). This lack of use highlights the urgent need for usability studies to find out what users really want and need, enabling more focused improvements. By focusing on usability, academic libraries can turn their digital sites into effective places for all information, which will likely increase user satisfaction and engagement with library resources (Bichard et al.).



The generated chart presents a comparison of various library metrics across three cities in India: Chennai, Kolkata, and Delhi. Each subplot showcases specific performance indicators relevant to academic, research, and central libraries. Caption: This chart illustrates and compares key performance metrics across libraries in Chennai, Kolkata, and Delhi highlighting usability, satisfaction, and efficiency scores.

C.Challenges faced during implementation of changes

Changing library websites in India has many problems, especially with adding new technologies and usability practices. Many libraries deal with pushback against change because of old workflows and staff who are used to traditional ways of sharing information. This hesitation is made worse by a lack of training and help for employees, making it hard for them to use user-focused design methods well. Moreover, weak technological infrastructure and little access to ongoing professional growth create issues for making the most of Web 2.0 tools and other advanced options that could improve user experiences. Additionally, looking at these changes shows a worrying gap in understanding the importance of usability studies among library leaders, as noted by evaluations indicating that the spread of web information services is still low ((Babu et al.)). This situation needs a strong effort to solve both tech and cultural issues to encourage better usability methods in academic libraries.

D. Lessons learned from case studies

Using case studies in usability studies gives important lessons that can help improve library websites in India. These studies show that focusing on users is very important, and knowing what users need and how they act is key to making good interfaces. For example, using methods like heuristic evaluations and usability testing, as shown in (Mwinyimbegu et al.), highlights how getting feedback from users can help make changes that fit what they need for information. Also, tackling accessibility issues, especially for underrepresented groups, as pointed out in (Agangiba et al.), is vital for building digital spaces that offer equal access to information. These lessons show that involving different user viewpoints not only makes the design process better but also boosts the effectiveness of library websites, leading to better and fairer access to resources for everyone. Therefore, using insights from past case studies can help create more practical and user-friendly library spaces.

V. CONCLUSION

To sum up, the importance of usability studies for improving library websites in India is very high. These studies not only make user experience better but also help libraries do their job as key information sources in a world that is more digital. As shown in the research paper From Card Catalogs

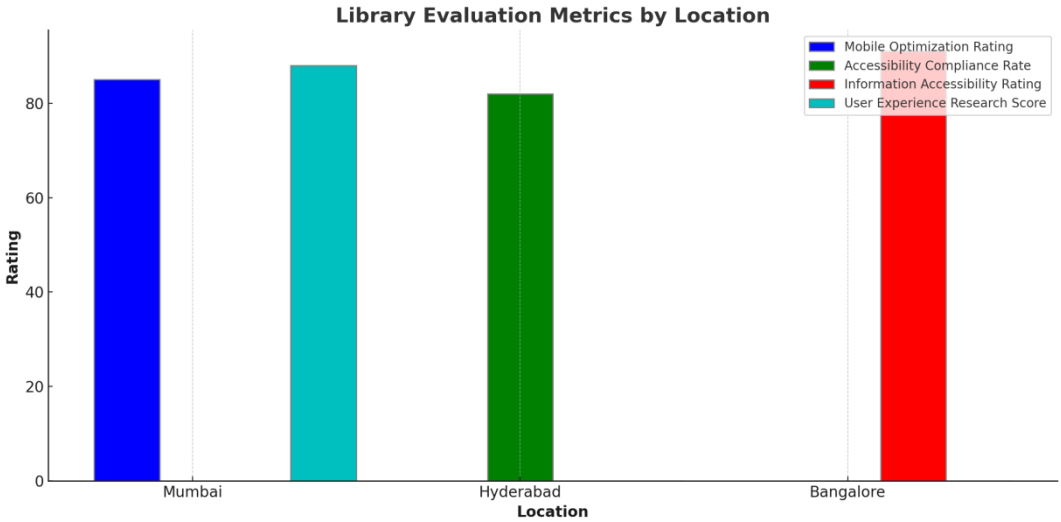
to Clicks, library websites play a key role in giving good access to a variety of digital resources, which shows the need for designs that focus on users (cite39). Additionally, the issues with the accessibility and quality of higher education institution (HEI) websites highlight how crucial it is to conduct evaluations to find and fix problems in design and function (cite40). In the end, the ongoing enhancement of library websites through usability studies leads to better involvement from users, encourages digital literacy, and helps the main goal of making knowledge available to everyone, especially in a diverse country like India.

A. Summary of key findings

The results from different usability studies highlight big problems with how well library websites in India work, showing a strong need for improvement. Research looking at the library websites of Indian Institutes of Science Education and Research (IISERs) showed that, although these sites have important information, they mostly miss key usability features, leading to a basic level of web functionality (cite41). Likewise, a study of university library websites in Delhi found that, even though there is relevant information about collections and services, there are very few Web 2.0 tools used, which reduces user interaction (cite42). These studies agree that libraries need to improve and develop their online platforms to create better user experiences and accessibility. By focusing on user-centered design and putting resources into usability assessments, Indian libraries can enhance their websites, which will improve service delivery and user satisfaction in the digital era.

B. Future directions for usability studies in library websites

As libraries in India start to use more digital tools, future studies on library websites need to change to meet new user needs and wants. These studies should go beyond usual user testing and include new methods like participatory design and user experience research, which help engage different user groups more effectively. Also, with more people using mobile devices, it is important for library websites to work well on mobile platforms, making responsive design an important focus area. By prioritizing accessibility and inclusivity, researchers can make sure that everyone, including people with disabilities, can easily navigate library resources. Moreover, studies could look into how social media impacts user interaction and information sharing. With these improvements, library websites can remain important tools, ensuring fair access to information and adapting to the changing demands of their communities, which is crucial for supporting lifelong learning in today's digital world.



The chart illustrates the evaluation metrics for libraries across three major cities: Mumbai, Hyderabad, and Bangalore. Each bar represents different ratings for mobile optimization, accessibility

compliance, information accessibility, and user experience research, highlighting the strengths and weaknesses in each library system.

C.The role of continuous improvement in user experience

Continuous improvement is crucial for better user experience, especially for library websites in India. By doing usability studies, libraries can find parts that need betterment, making sure services meet changing user needs. For example, the research mentioned in From Card Catalogs to Clicks shows the importance of user-focused design that fits the digital habits of users and helps them access resources easily (Rathee et al.). Also, studies on public university libraries in Bangladesh point out the need for responsive web designs and mobile-friendly layouts for users with low digital skills (Shah et al.). These results emphasize that regular updates, based on user input and careful testing, create a flexible space that not only boosts user contentment but also raises overall interaction with library resources. Thus, continuous improvement stands out as a key strategy for building a more effective and inclusive user experience.

D. Final thoughts on enhancing library services through usability studies

In closing, putting usability studies into development of library websites in India is an important move for improving user experience and access. By looking closely at how users interact and what they like, libraries can find problems and make navigation easier, leading to a more user-friendly digital space. These studies help library staff create better services and build a stronger relationship with a wide range of users, such as students, researchers, and general visitors. Also, using design methods that change based on user opinions can help libraries keep improving and meet new user needs. Thus, the effort to carry out thorough usability studies is key for libraries that want to stay important in the digital world. This effort not only helps use resources better but also increases user satisfaction, making libraries essential cultural and educational centers in their communities.

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