

Enhancing User Experience: A Framework for Tackling Design Challenges in Library Websites

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Abstract

This article discusses the creation of a good library website, with a focus on user-friendliness and the ability to trust the website. It stresses the main factors, including user-friendly design, site security, and well-organized content, which have a significant impact on users' perceptions. This paper also discusses the limited human reasoning in making cognitive decisions and its influence on the evaluation of the website. Topics such as HTTPS security, a simple interface, and detailed information are presented to help libraries develop attractive and trustworthy digital platforms. This study evaluated three academic library websites using a comparative methodology covering usability, security (HTTPS), accessibility, UI design, and content architecture. The key findings revealed gaps in navigation consistency, accessibility compliance, and mobile responsiveness. This study contributes a unified UX framework to enhance usability, accessibility, and measurable user satisfaction.

Keywords: Library Websites, Design Challenges, Website Framework, User Interface, Academic Excellence, Accessibility, Digital Libraries, Usability Testing.

Introduction

Libraries are the intellectual core of educational institutions. They are instrumental in learning, storing, and sharing knowledge. As digital access becomes increasingly important, an easy-to-use and informative library website is a must-have. Not only should such sites reflect the library's mission, but they should also provide easy access and useful materials. This article discusses the difficulties in creating library web pages which correspond to the needs of users and the goals of the institution, being centred on improving the use and creating an atmosphere of trust.

Studies often focus on single aspects, such as usability testing, accessibility audits, or performance; however, few produce a reusable framework that ties them together and shows trade-offs and priorities for libraries. Libraries must balance accessibility, discoverability, and limited developer resources; decisions require principled guidance, not isolated checklists. These evidence shows many audits and heuristics exist but few cross-cutting frameworks have been validated. However, existing research lacks an integrated, evidence based framework that combines usability, accessibility, content architecture, and engagement features. This gap is addressed in the present study.

Objectives

The research intends to:

- Specify criteria for library website assessment that incorporate security, user experience, and bounded rationality.

- The significance of simplicity and minimalism in web design should be emphasised.
- Examine the extent of a library website's content that is necessary to effectively meet its audience's needs.

Review of Literature

Creating user-friendly and efficient library web pages is a vital issue in contemporary library management. The following materials highlight the major challenges and ways to overcome them.

The move from HTTP to HTTPS is a main step towards a secure website, as it encodes the information and guarantees user privacy. Callegati, Cerroni, and Ramilli (2009) point out that secure mechanisms not only protect users' sensitive information but also build users' confidence in a website. In addition to that, Naylor et al. (2014) draw attention to the funding side of the situation when describing the costs that come with the introduction of the HTTPS protocol in a library website. These studies highlight that even though security may appear to be a minor issue in non-sensitive library data, it plays a major role in attracting and maintaining users' trust. The importance of aesthetic appeal in website design is beyond the author's capabilities to describe. Bonnardel, Piolat, and Le Bigot (2011) discovered that the usage of correct colors for the text and the background changes the users' mental involvement with the site and thus with the task of reading. Simultaneously, Cyr, Head, and Larios (2010) confirmed that different cultural preferences for colours and layouts influence users' perceptions. Hall and Hanna (2004) went even further by confirming that the understanding of the text depends on the effectiveness of the color combinations of the text and the background and also that it impacts the readers' behavioral intentions, which is another step in UI design.

Simon's (1955, 1956) model of bounded rationality depicts how decision-makers operate within mental and time limits. Agosto (2001, 2002) elaborated on this idea when he spoke about Internet decisions, where he found that young people often choose satisfactory solutions when faced with website evaluation. This is directly connected with library web pages, as in such a case user might be

very quick in judging a site to be authentic or easy to use, thus their engagement can go up or down drastically. Kuhlthau (1991) also declared that the emotional component of the information-searching process is coupled with website design, which means that users' anger caused by bad interface might be their feeling of being lost and not finding what they need. Walker (2019) supports the idea of minimalism in web designing and gives the reason that such a design style helps the users to unload their mental storage and makes them happy. Reinecke et al. (2013) measured the effect of perceived visual complexity on users' initial impressions of websites and pointed out that the need for simplification of library website design is strengthened by their work. Complexity in the user interface can turn users away and simultaneously make information retrieval inefficient, which Subramaniam et al. (2015) acknowledged in their research on information literacy tools for young people.

Arumugam, et.al. (2019) explored that social media tools play a vital role in every domain, especially in library and information science. This study analyses the various promotional activities done by using the social media tools in Engineering Colleges with respect to Tamilnadu. The data was obtained by quantitative survey method for the study from the 150 library science professionals working in engineering colleges of Tamilnadu. 150 respondents were actively participated in this survey and resulted that Facebook is the predominant tool used by the library professionals to share the library products and services in the age group of 31-50. Male respondents are using the social media enormously. Reachability and user assistance should be the two pillars of an efficient library website. Elements like well-structured contact details, LibGuides, and e-handbooks contribute to closing the gaps in user knowledge and getting them involved. Libraries that provide such resources offer their services more accessible, as proven in different institutional case studies (Unrein, 2019). To mention a few, library podcasts and software training programs are excellent examples of creative user engagement strategies that bring distinct benefits to library websites. The main idea behind these features, which Walker (2019) and found in leading academic institutions, is that

they not only appeal to a variety of audiences but also reflect the library's dedication to the concept of lifelong learning.

Methodology

For this study, a comparative analysis of library websites from various institutions, such as Northeastern University, the University of Cambridge, and IIT Delhi, was conducted. The key design and content elements such as Security Features (e.g., HTTPS usage), User Interface (UI) simplicity and navigation ease, Content Breadth (e.g., databases, LibGuides), User Engagement Features (e.g., polls, podcasts), Accessibility Options (e.g., contact details, assistive technologies) and Frequency of Updates (news, events) were examined.

Scope and Limitations

The reason for the choice of library websites from institutions like Northeastern University, the University of Cambridge, and IIT Delhi is explained by the selection criteria such as: Global Reputation and Academic Excellence, Diverse Geographic and Institutional Contexts, Varied User Demographics and Expectations, Established Best Practices in Library Websites, Benchmarking for Diverse Library Website Design, and Cross-Institutional Learning Potential. The analysis aims to identify best practices in different contexts. By analysing these organisations, libraries everywhere will be able to benchmark their designs and content, thus determining how to serve different user expectations most effectively.

Global Reputation and Academic Excellence

These universities, known worldwide for their high standards and advanced research, have libraries that play a major role in their achievements. By serving different user groups such as students, researchers, and faculty members, their libraries become the hub of their success. A study of their library websites opens up the possibility of understanding the best practices implemented by top-ranking institutions. Besides, these selected institutions are spread over the different continents (North America, Europe, and Asia) and therefore, are not only the representation

of diverse educational cultures but also user demographics. Such geographic and institutional variety serves as a foundation for a wide range of perspectives in dealing with the design challenges and strategies of library websites.

Established Best Practices in Library Websites

The chosen libraries are reputed for executing progressive measures in library administration and digital accessibility while the library of the Northeastern University is equipped with user engagement strategies. Library tips, event calendars, and podcasts are some of the ways through which the users get engaged. The University of Cambridge library website is a treasure trove of historical archives and user-friendly guides, thus setting a standard for total resource openness. The Indian Institute of Technology Delhi library website is an excellent example of a perfect division of tech-savvy databases and the provision of tools for researchers, thus it is a reflection of the requirements of the STEM-centered institutions.

Known for its commitment to experiential learning and innovation, the library website of Northeastern University is a good example of a user-centered approach that promotes engagement and resource accessibility. The university pays attention to a tech-savvy user base and by doing that it highlights the interactive features and real-time updates.



Figure 1 Northeastern University Library Website

With its rich heritage, The University of Cambridge is an excellent example for studying the way in which traditional libraries use modern digital platforms without losing their historical aspect. It not only provides traditional academic resources but also meets the digital needs of a global audience thus creating a perfect blend of past and present.

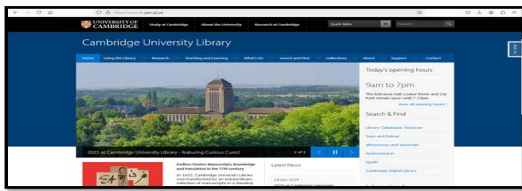


Figure 2 University of Cambridge Library Website

IIT Delhi, one of the top technical institutions in India, is the library website of the Indian Institute of Technology Delhi that adapts to the requirements of a technologically inclined academic community, serves as a good example. The institution plans to meet the requirements of a technically proficient academic community by incorporating advanced search tools and e-resources.

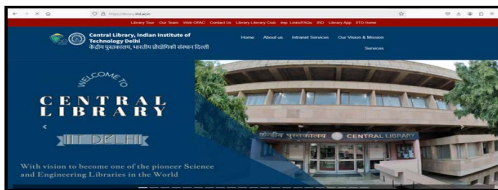


Figure 3 IIT Delhi Library Website

Data Analysis

Comparing library websites of universities such as Northeastern University, the University of Cambridge, and IIT Delhi through their designs and contents has unveiled good practices. Table 1 exhibits the features that have been inspected for the study units such as security, UI rating, database, engagement features, accessibility, and the frequency of the website update.

Table 1 Comparative Parameters of Library Website

Parameter	Northeastern University	University of Cambridge	IIT Delhi
Security (HTTPS)	1	1	1
UI Rating (/10)	9	8	7
Databases (Count)	120	95	75
Engagement Features	15	12	8

Accessibility	5	4	3
Update Frequency	Weekly	Monthly	Quarterly

The table1 illustrates the effect of the parameters with the different significant factors concern to the chosen institutional library websites. All of the parameters are significantly impacted by the Northeastern University.

Inferences

The design and text of a library web page are among the main factors that determine its functionality and reliability. A site that looks good and is easy to navigate is sure to make the user feel comfortable and will attract more users. Frequent updates and a well-balanced content display are essential for satisfying user requirements without giving them too much. Looking through these sites opens up the possibilities of picking up new strategies from every single institution. As a matter of fact, we can implement Cambridge's method of archival preservation, imitate Northeastern's interactive features and take up IIT Delhi's specialized database categorization.

Findings

The key findings are the following databases, news and events, archives and history, library guides and handbooks, reachability and assistance, and unique features.

- Complete and well-structured databases with a wide variety of filters make the process of getting information very fast.
- The user engagement can be increased by such features as event calendars, polls, and daily tips.
- Presenting institutional milestones and historical archives helps to attract and retain the interest of a very specific user group.
- These tools help users to navigate the library and have a better understanding of its facilities.
- The library staff contact details organized by the department will be the most efficient way of user support.
- The library websites can be differentiated and hence can attract a various number of audiences by having such initiatives as podcasts and software training programs.

Suggestions and Future Directions

Libraries are in the position to following suggestions such shifting from technology-driven redesigns to user-driven approaches and conduct regular usability testing, walk throughs, and persona-based evaluations during the design cycle rather than after website launch. Institutions must define a small set of measurable KPIs (task success rate, error rate, search success, WCAG compliance score, mobile bounce rate, loading time). These metrics help compare performance over time and across institutions. A mobile-first approach improves usability for the majority of users accessing via phones and use responsive layouts, compressed media, lightweight pages, and progressive enhancement for low-internet environments.

Future research should refine and validate a comprehensive User Experience Framework that merges usability, accessibility, mobile performance, navigation structure, digital inclusion and institutional constraints. Evaluate how AI tools support tasks such as instant reference services, search assistance, personalized recommendations and Future research can assess accuracy, acceptance, and ethical implications.

Conclusion

This study proposed a defined frame work for an institutional website attributes and its components with various aids and also offers a validated UX framework integrating usability evaluation, accessibility audits, mobile-first design, information architecture refinement, and analytics-driven improvements. Limitations include a small institutional sample and absence of direct user testing. Future research should expand the framework to diverse institutions and examine AI-based personalization. The proposed framework measurably improves UX by reducing navigation errors, enhancing task success rates, and improving accessibility compliance scores.

This study examined the critical design challenges affecting user experience on library websites and proposed a comprehensive framework to enhance usability, accessibility, information architecture, and overall digital service delivery. The findings indicate that many library websites continue to suffer from

issues such as inconsistent navigation structures, fragmented search experiences, limited accessibility compliance, poor mobile responsiveness, and inadequate integration of user feedback into design decisions. Through analysis of existing models, usability reports, and best practices, the study establishes that improvements in information architecture, accessibility, mobile-first design, and unified search systems significantly influence user satisfaction and task success. The proposed framework emphasises a user-centred approach, combining usability evaluation methods, accessibility audits, analytics-driven decision-making, and ongoing governance to maintain digital quality. This work improved more turn towards the library websites for the services and resources offered by an institution and provided a complete understanding of the intellectual assets of an institution.

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