

USABILITY OF OPEN SOURCE CONTENT MANAGEMENT SYSTEMS IN LIBRARIES: A COMPARATIVE EVALUATION OF LEADING TOOLS FOR MANAGING LIBRARY CONTENT

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Abstract: With the rapid development of digital resources, libraries are transforming into dynamic knowledge repositories and adopting diverse communication tools to enhance service delivery to users. They are increasingly seeking new paradigms to provide effective services directly to customers at their desktops. Open-source Content Management Systems (CMS) have become pivotal tools for libraries to manage dynamic websites and digital collections. This paper presents a comprehensive study and evaluation of major open-source CMS platforms used in libraries, focusing on their usability and suitability for library portals. Major tools analyzed include general-purpose CMS (WordPress, Joomla, and Drupal) and library-specific digital repository platforms (DSpace, Omeka, and Greenstone). This study presents a comparative analysis of selected CMS tools based on usability criteria such as ease of use, customizability, community support, multilingual support, security, documentation, integration with library systems, scalability, and mobile responsiveness. The study includes examples of CMS implementation from prominent library portals in India and across the globe. The findings of the study indicate that WordPress and Joomla are highly usable for content editors for their intuitive interfaces while Drupal excels in customization. Library-specific tools like DSpace, Omeka and Greenstone offer strong repository features and collection-building support but require more technical expertise for site administration. The finding also highlights that robust community support and active development enhance usability for non-technical library staff. Open-source CMS platforms offer cost-effective, flexible solutions for library portals, with the choice dependent on balancing ease-of-use and functionality. Proper selection and implementation of CMS tools can lead to highly usable and effective library web systems.

Key words: Content Management System (CMS), Open Source CMS, Library Portal, Library Website Development, Comparative Study of CMS

1. Introduction

Modern libraries rely heavily on web portals to deliver services, digital resources, and community engagement. Early library websites were often static collections of HTML pages, which proved

difficult to maintain and update as content grew (Black, 2011). As a result, many libraries have adopted Content Management Systems (CMS) to separate content creation from site design, enabling librarians to manage content without

deep technical knowledge (Kumar, 2007). Concurrently, the open-source movement has influenced libraries to favor freely available, community-developed CMS solutions. As a result, platforms like WordPress, Drupal, Joomla, DSpace, Omeka, and Greenstone have become popular choices for library websites and digital collections (OCLC WebJunction, 2017).

This paper investigates the usability of these open-source CMS in library contexts. We compare their features and usability, and illustrate our analysis with case studies from Indian and global libraries (e.g. the National Digital Library of India, Indian Institute of Technology libraries, the British Library, the Library of Congress, Europeana). By evaluating both general-purpose and library-specific systems, we aim to guide libraries in selecting CMS that best fit their needs.

2. Literature Review

Previous studies have highlighted the necessity of CMS for library websites. There are some research papers that have made studies on usability of CMS in developing library portals and delivering library services. Fales (1999) conducted a survey which provides an overview, needs and benefits of content management. Furthermore, this study explained that content management is a set of rules, roles and processes that organize the life cycle of content or document and provide accurate information. The article primarily focuses on using and applying content management system in the libraries where web-

based resources play a crucial role. An extensive research was performed by Parmer and Patel (2015) where they performed a pilot project on the growth of a dynamic website using Joomla , an open source web content management system. The primary purpose of this research was to evaluate the adaptability of an open source web CMS. The authors proposed in their research that Joomla as a web CMS has many characteristics that have been useful to create and manage contents of lucrative websites. Dickson and Holley (2010) showed that it is also possible to integrate social networking tools into CMS platform to redesign the platform in an appealing manner for consumers to reach out. Choy (2011) mentions that modern librarianship needs to adopt CMS like tools to stay connected with users. He emphasizes that libraries need to be part of the new tools to allow anytime access to the users. Pope (2015) emphasizes on use of open source CMS tools for greater flexibility and mentioned the application of some library specific CMS. Martinez-Caro et al (2018) makes a comparative analysis of three most popular CMS viz., Drupal, Joomla and Wordpress depending on their salient features and functionalities. Haneefa et al. (2013) observed that dynamic content (blogs, RSS, user comments) poses challenges for libraries without CMS; open-source systems reduce these burdens by allowing librarians to focus on content over coding. Moreover, literature on open-source adoption in libraries emphasizes cost-savings, vendor independence, and community-driven

innovation as major benefits of open-source software (Sharma & Khan, 2021).

Overall, the consensus is that open-source CMS make library web publishing more feasible and flexible; however, comparisons of usability across different systems, especially library-oriented digital resource management platforms like DSpace or Greenstone are less common, motivating the current study.

3. Objectives of the Study

The main objectives of this study are:

3.1. Evaluate Usability: Assess how user-friendly and efficient major open-source CMS are for library professionals (considering effectiveness, efficiency, and satisfaction)

3.2. Compare Features: Compare CMS (WordPress, Joomla, Drupal, DSpace, Omeka, Greenstone) on criteria including ease of use, customizability, community support, multilingual support, security, documentation, system integration, scalability, and mobile responsiveness.

3.3. Case Studies: Illustrate real-world usage through case studies of library portals, focusing on Indian examples (National Digital Library of India, IIT libraries) and global portals (British Library's Endangered Archives, Library of Congress, Europeana).

3.4. Guidance for Libraries: Provide an overall usability assessment and practical insights to help libraries select and implement an appropriate CMS.

4. Methodology

The methodology adopted in this study is primarily qualitative and comparative in nature, focusing on evaluating the usability and suitability of select widely used open-source Content Management Systems (CMS) for library applications. It covers three general-purpose CMS platforms—WordPress, Joomla, and Drupal—and three library-specific digital content management tools—DSpace, Omeka, and Greenstone. The analysis is based on an extensive review of literature sourced from print journals, online publications, and credible web-based resources. The study involves a combination of literature review, feature-based comparative analysis, and case study examination

5. Definitions of Key Concepts

5.1. Content Management System (CMS):

Collaborative software for creating, modifying, and managing digital content, typically providing tools such as a visual editor, workflow for roles, and online content presentation (Kohan, 2019). A content management system (CMS) is a tool that aids companies in managing digital content, allowing teams to create, edit, organize, and publish content. It stores content, provides automated processes, and assigns privileges and responsibilities based on roles, ensuring efficient and collaborative content creation (Oracle, 2021). CMS allows content creators (e.g. librarians) to update a website without coding, by separating content from design.

5.2. Usability: In terms of software design “usability” is the usefulness of the product which is a key attribute determining its quality, assessing whether the product's intended goals can be achieved through its actual use (Walker, 2019). As per ISO 9241-11, it is the “extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use” (NIST Glossary, 2020). In this study, it refers to how easily library staff can use a CMS to update and manage a library website.

5.3. Open Source: Refers to software whose source code is publicly accessible and which can be freely used, modified, and distributed. Open-source projects emphasize collaborative development, transparency, and community-driven improvement. In the library context, open-source CMS mean libraries can adapt the system to their needs without licensing fees (What Is Open Source? | Opensource.com, n.d.).

5.4. Library Portal: An integrated web interface or website that provides access to library resources, services, and information. It may aggregate catalogs, digital repositories, user account features, news, and guides, often requiring a robust CMS to manage diverse content (Das, 2019).

5.5. Digital Repository/Archive: A system (often open-source) designed to store, preserve, and provide access to digital documents (e.g. theses, images, manuscripts). Examples include DSpace (institutional repository software) and Islandora

(Drupal + Fedora framework for archives). Integration with CMS and search protocols (e.g. OAI-PMH) is an important consideration for library portals (Chandran, 2013).

6. Importance of CMS in Libraries

Libraries face constant updates of content (event announcements, digital collections, user guides) and demand for interactive features (search interfaces, user accounts, blogs). Without CMS, even routine updates require technical intervention. Prior work emphasizes that libraries moving from static HTML to CMS have achieved more maintainable websites and consistent design (Black, 2011). A CMS centralizes content management: librarians can add events, news, and resources via intuitive interfaces, ensuring the site stays current. It also enforces consistent site-wide layouts automatically. Kumar (2007) notes that with CMS, “library professionals can create and update [a website’s] content while focusing on content without worrying about the layout” Open-source CMS, in particular, are often highlighted for libraries because they are “viable in terms of functionality, cost, and maintenance”. Oakes (2006) highlighted several key benefits of using content management systems (CMS) for library staff, including the ability to create and publish content without coding knowledge, manage editorial teams, ensure content quality and consistency, reuse content across formats, and eliminate programming errors. Beyond these, CMS platforms offer a unified interface that

integrates OPAC, e-resources, and notices, enhancing user experience and saving time. Their user-friendly nature ensures quicker content updates and more dynamic sites compared to static pages. Libraries can also analyze content performance using tools like Google Analytics. CMS empowers librarians to focus on accuracy and relevance, supports outreach to remote users, encourages innovative content creation (e.g., blogs, multimedia, book reviews), and facilitates user engagement through social tools and feedback mechanisms.

Thus, CMS is critical for libraries to efficiently manage their web presence, support multilingual communities, and integrate digital services (catalogs, repositories) in a user-friendly way.

7. Types of CMS in Libraries

7.1. Enterprise Content Management (ECM)

Enterprise content management (ECM) is a collection of standard procedures, strategies, and tools that enable a business to acquire, manage, store, and deliver critical data to its staff, stakeholders, and clients efficiently. ECMs are mainly designed for managing commercial ventures. Any content management system including Web Content Management Systems (WCM), E-Commerce websites are type of ECM. Popular examples of ECMs are - Alfresco, TYPO3, Joomla etc.

7.2. Web Content Management System (WCM)

A Web Content Management (WCM) system is a software application used to create, manage, and

publish digital content on websites. It supports various content types, including text, images, videos, audio, and interactive elements. WCM systems are a type of Content Management System (CMS) designed to make web publishing easy, allowing users to update content without technical skills like HTML coding. They simplify content updates, reduce complexity, and ensure consistent site management. Common examples include Alfresco, TYPO3, and Joomla.

7.3. Digital Repository Software as Library CMS

Digital Repositories (DR) are structured systems that deal with cluster of specialized users, collections and value-added services, and are being developed as highly specific content management purpose. Creation of digital contents, organization, metadata management and provision of access mechanisms are the basic principles of information management through digital repositories. They also allow configuring collaborative spaces through the access and management of distributed collections. Thus DR software also acts as CMS for library and information centres. The current state of the main tools varies greatly, as does their focus, for they range from federated record repositories (such as Fedora), publication management (such as Dspace) to end user tools (such as Greenstone) and management of museum and archival materials (e.g., Omeka).

8. Major Open Source CMS Used in Libraries

Libraries commonly use both general-purpose and domain-specific open-source CMS. Key platforms include:

8.1. WordPress: Originally a blogging platform, it is now a full-featured CMS. WordPress is celebrated for its ease of use and vast ecosystem of themes and plugins. It is reported that WordPress powers over 40% of all websites including many small-to-medium library sites. Its intuitive WYSIWYG editor and wide community support make it popular among libraries for blogs, news, and event pages (WordPress | Blog Tool, Publishing Platform, and CMS, n.d.).

8.2. Drupal: A highly flexible and extensible CMS, Drupal is widely used for large and complex library websites. It has a modular architecture with thousands of modules for customization. Drupal's strength lies in handling diverse content types and permissions, though it typically requires more technical skill. Many academic libraries (especially in India) favor Drupal due to its scalability and strong multilingual capabilities (Drupal CMS, n.d.).

8.3. Joomla: A general CMS positioned between WordPress and Drupal. Joomla offers a balance of user-friendliness and flexibility. It provides a structured interface and multilingual support out of the box, making it a middle-ground choice when WordPress is too simple and Drupal too complex (Joomla! CMS, n.d.).

8.4. DSpace: An open-source digital repository platform popular in academic libraries for

managing theses, dissertations, and research data. While not a website CMS in the traditional sense, DSpace often powers the “digital collection” part of a library portal. Its focus is on metadata management and preservation rather than front-end design, but it integrates with CMS or serves as a backend for digital archives (DSpace, n.d.).

8.5 Omeka: A web-publishing platform designed for creating online exhibits and digital collections. Omeka (built by the Roy Rosenzweig Center) emphasizes ease of use for curators and educators. It provides exhibit-builder plugins and supports Dublin Core metadata. It is free and open-source, and case studies note its user-friendliness for building curated digital collections (Omeka, n.d.).

8.6. Greenstone: A digital library software suite developed by the University of Waikato and UNESCO. Greenstone specializes in organizing and distributing digital library collections. It supports multiple formats and OAI-PMH harvesting. As one fact sheet explains, “Greenstone is a suite of software for building and distributing digital library collections... It is open-source, multilingual software, issued under the terms of the GNU GPL”. Libraries use Greenstone when building specialized digital archives (Greenstone Digital Library Software, n.d.).

9. Why Open Source CMS in Library?

The library sector has strong incentives to adopt open-source CMS. Firstly, cost-effectiveness - there are no licensing fees, which is crucial for

publicly funded libraries. Mirdha (2014) points out that open-source CMS lower the financial barrier to advanced functionality. Secondly, customizability and control - libraries can modify source code to tailor features (for example, integrating an OPAC or institutional repository) in ways that proprietary systems often restrict. Thirdly, community support - major open-source CMS have large developer and user communities providing free plugins, security updates, and documentation (as discussed later, all three major CMS have active communities (Pope, 2015).

This collective support aligns with libraries' ethos of collaboration and knowledge sharing. Fourth, long-term sustainability: open-source platforms are not tied to a single vendor's lifecycle, reducing the risk of vendor lock-in. Finally, open-source aligns with the open knowledge mission of libraries. As a case example, the National Digital Library of India (NDLI) was built on an open-source platform with open learning contents and open policies, illustrating institutional preference for open standards (Open Education Global Awards, 2020).

10. Comparative Study of Major Open Source CMS including Library Specific Digital Repository Software

To compare usability and functionality, we evaluate each CMS on key criteria. A summary comparison is given in Table 1. Following the table, we discuss each criterion.

CMS	Ease of Use	Customizability	Community Support	Multilingual Support	Security	Documentation	Integration	Scalability	Mobile Responsiveness
WordPress	High – very user-friendly, intuitive visual editor	High – thousands of plugins/themes (no coding needed)	Very large – global user base, many forums	Via plugins (e.g. Polylang)	Frequent updates, large attack surface via plugins	Extensive tutorials/docs	Many APIs/plugins (e.g. REST API); 3rd-party tools	Good for small/medium sites; caching improves performance	Yes – many responsive themes available
Joomla	Medium – relatively easy setup; interface steeper than WordPress	Medium – templates and extensions available	Large – active developer base	Built-in multilingual (core feature)	Regular updates; risk depends on extensions	Comprehensive (official docs + community)	Extensions for integration exist (OPAC modules)	Moderate – suitable for medium sites	Yes – templates support responsive design

Drupal	Low – more complex interface, steep learning curve	Very high – modular architecture, custom code	Large – especially tech-savvy community	Strong (core support with 18 modules)	Very strong – security-focused architecture	Extensive (detailed API docs + guides)	Many modules for library needs (e.g. Islandora)	Very high – built for large, enterprise sites	Yes – responsive themes but needs configuration
DSpace	Low – tailored to librarians/researchers, not general web admins	Medium – configurable; plug-ins for batches	Strong in academic sector	Yes – multiple UI languages available	Enterprise-grade security (institutional support)	Good (guidebooks and community wiki)	Integrates via OAI-PMH and REST (e.g. CRIS, OPAC)	High – designed for large repositories	Basic – older UI; newer versions improving
Omeka	Medium – user-friendly interface for exhibits (no coding needed)	Low – limited to exhibit templates/plugins	Moderate – niche (museums, libraries)	Yes – uses PHP gettext; plugins available	Good – fewer users means fewer attacks; core is secure	Good (online manual, tutorials)	OAI-PMH support; can embed library records	Moderate – suitable for special collections	Yes – theme templates can be responsive
Greenstone	Low – requires training (Java GUI tools); mainly for librarians	Medium – customizable via configuration and plugins	Small – specialized community	Yes – designed for multilingual collections	Fair – security depends on server; less target focus	Limited modern documentation	Excellent OAI-PMH and METS interoperability	High – proven for multi-million item collections	Limited – classic interface; new GUIs needed

Table 1: Comparative Study of Major Open Source CMS used in Library

11. Usability Study of CMS in Libraries: Criterion-based Discussion

11.1. Ease of Use: WordPress is consistently ranked highest for user-friendliness. Its one-click install and intuitive WYSIWYG editor allow even non-technical users to publish content. Joomla

also offers easy installation and a relatively straightforward interface, though less polished than WordPress (Ratajeski, 2014). In contrast, Drupal's backend is complex and intimidating for beginners (Wilson, 2009). Specialized systems like DSpace and Greenstone require training; they

have librarian-oriented interfaces that are powerful but not built for casual users. Omeka strikes a balance: its admin UI is simpler than a code-heavy system, making it relatively easy for curators to build exhibits without coding (Kucsma et. al., 2010). WordPress is often considered the most user-friendly CMS platform whereas Drupal and Joomla may require more technical expertise (Pope, 2015). MacCormick (2012) similarly emphasizes that WordPress's ease of use suits small sites, while Drupal's complexity serves large-scale projects.

11.2. Customizability: Drupal leads in raw flexibility: it has thousands of modules and allows custom content types via code, making it ideal for complex library sites. Joomla and WordPress also offer numerous templates and extensions; WordPress's plugin ecosystem is particularly vast, often requiring no programming to achieve features. Joomla falls in between (Bernacki, et al., 2016). DSpace and Omeka offer plug-in architectures but are more limited: DSpace custom fields and workflows can be extended, but its primary function is as a repository. Omeka's exhibit-focused model means fewer options beyond exhibit plugins. Greenstone is configurable through its Java-based 'librarian' interface, but customization generally targets collection building (e.g. index types, metadata schemes) rather than website features. Table 1 highlights that all systems allow some code customization, but the level of required technical expertise varies. All three, WordPress, Drupal and

Joomla provide ample customization options. WordPress offers many themes and plugins without requiring advanced technical knowledge; Drupal and Joomla provide more advanced options that may require greater technical proficiency (Patnaik and Mishra, 2015).

11.3. Community Support: WordPress enjoys by far the largest user and developer community. Tens of thousands of plugins/themes and countless tutorials are available online. Drupal also has a large, active community (e.g. Drupal.org forums, StackExchange) that emphasizes best practices and enterprise solutions. Joomla's community is somewhat smaller but still substantial, with active forums and documentation (Sharma et al., 2009). DSpace's community is robust within academic libraries: it has official releases, an active user list, and institutional contributions (e.g. Lyris and DuraSpace support). Omeka's community is more niche (mostly GLAM and DH scholars), but it provides discussion forums and curated guides. Greenstone's community is relatively small (led by the UNESCO-sponsored Greenstone Consortium); its documentation is less extensive and more dated, reflecting fewer recent contributors. In summary, all platforms have community support, but its scale and focus differ: WordPress and Drupal communities are broad and general, while DSpace/Omek/Greenstone communities are specialized (RLG-OCLC Report, 2002).

11.4. Multilingual Support: Joomla and Drupal have strong built-in multilingual features e.g., Joomla supports translations in core and Drupal has core i18n modules. WordPress requires plugins (e.g. WPML) to achieve true multilingual sites (Bernacki, et al., 2016). DSpace's interface comes with translations in many languages. Omeka supports translation of its UI (using PHP gettext) and metadata. Notably, Greenstone is explicitly multilingual by design (supporting Unicode and many languages) (Singhal et. al, 2010). In practice, multilingual support often relies on community extensions (WordPress/Joomla) or core capabilities (Drupal, DSpace, Greenstone) to present content in multiple languages and scripts (Ratajeski, 2014).

11.5. Security: Security is critical in library systems. Drupal is generally recognized as very secure: it has a dedicated security team and rigorous review of modules. Naseer (2020) notes "Drupal is generally regarded as the most secure CMS". WordPress and Joomla are also secure platforms, but their large plugin ecosystems and popularity make them frequent targets; thus, they require frequent updates and careful choice of extensions. DSpace, Omeka, and Greenstone tend to have smaller user bases and fewer third-party plugins, potentially reducing exposure. DSpace and Greenstone are deployed behind institutional infrastructure, which can add security layers. Table 1 reflects that Drupal's security module and update schedule give it an edge. Additionally, libraries often deploy SSL and hardened servers

(LAMP stacks) to secure these CMS (Petkova, 2020).

11.6. Documentation: All platforms have substantial documentation. WordPress, Drupal, and Joomla maintain detailed official docs and many community-written guides. DSpace has thorough manuals (user and admin guides) and scholarly articles. Omeka offers an online manual and tutorial videos. Greenstone's official documentation is more limited (older manuals and community-driven wikis). Naseer (2020) comparison suggests all three major CMS "provide an exceptional user experience by offering extensive official documentation and support from active user communities". However, the ease of finding answers varies: WordPress and Drupal answers are abundant via blogs and Q&A sites; answers for Omeka and Greenstone may require digging into mailing lists or PDF guides.

11.7. Integration with Library Systems: Integration with existing library systems (OPACs, digital repositories, authority files) is often required. WordPress and Drupal have plugins/modules for connecting to library catalogs and repositories (e.g. VuFind plugins for WordPress, Islandora module for Drupal) (Patnaik and Mishra, 2015). Joomla also has some integrations. DSpace itself is a repository system; it exposes content via OAI-PMH and REST APIs. Omeka supports OAI-PMH and Dublin Core import/export, making it easy to share exhibit items. Greenstone is highly interoperable: it can harvest and serve collections via OAI-PMH and

export/import METS/Dspace records. In fact, Greenstone was designed to interoperate with other DLs. Any collection can be exported to DSpace and any DSpace collection can be imported into Greenstone (Hochstenbach et al., 2003). Table 1 indicates that integration capabilities often depend on available plugins or protocols. In practice, libraries often run DSpace or Greenstone as back-end repositories and use WordPress/Drupal front-ends as portals, linking them via APIs (Cogapp, 2015).

11.8. Scalability: Drupal and DSpace are engineered for large-scale deployments. Drupal powers enterprise sites (thousands of pages) and can scale with caching and clustering. DSpace and Greenstone have been deployed for millions of documents (e.g. Greenstone handling multi-million article collections (Mirdha, 2014). WordPress and Joomla can also scale to large sites but may require careful hosting optimization. Omeka, by design, suits smaller curated collections (dozens to hundreds of items) and might not be optimal for extremely large archives. The British Library's Endangered Archives project, for example, serves 300,000+ images via a Drupal/Islandora setup illustrating Drupal's scalability. Thus, Table 1 rates Drupal/DSpace/Greenstone highest for scalability, with WordPress/Joomla/Omeka more limited in extremely large deployments (Balcas et al. 2017).

11.9. Mobile Responsiveness: Modern CMS often provide mobile-responsive themes or require minimal setup for mobile. WordPress, Drupal, and

Joomla have many responsive themes (Naseer (2020)). Omeka's default themes are also often responsive. DSpace's older UI is less mobile-friendly, though new versions are improving. Greenstone's classic reader interface is not inherently responsive, but some customization can enable basic mobile viewing. Since mobile is an expected feature of user-facing sites, libraries using WordPress/Drupal/Joomla typically achieving responsiveness via theme choice. This criterion tends to favour general CMS, as they were built for general web use, whereas legacy library software may lag without upgrades (Sunny, 2008).

12. Evaluation and Overall Usability Assessment

Synthesizing the above, we find that usability trade-offs depend on library priorities. For libraries with limited technical staff, WordPress is often the safest choice. Its ease-of-use, huge theme/plugin library, and active support mean that librarians can maintain content with minimal training. However, WordPress may lack enterprise-level features out-of-the-box, and securing a complex site requires careful plugin management. Joomla occupies a middle ground: it offers good multilingual and access-control features while remaining moderately approachable for users, but it too requires some technical oversight. If deep customization, scalability, or advanced workflows are needed, Drupal is preferable. Despite its steep learning

curve, Drupal's robust architecture yields powerful control. It is favored by many large academic libraries for this reason. Drupal's strong security reputation and enterprise-level integration options (e.g. Islandora, Primo) make it well-suited to high-demand portals, as seen at the British Library and Library of Congress projects. For specialized library functions, domain-specific CMS excel. DSpace is essentially a digital repository CMS; its usability lies in handling metadata and access rather than designing attractive web pages. It is highly scalable for institutional collections, and many libraries pair it with a Drupal/WordPress front-end for interface. Omeka is very usable for building exhibits and small collections; its UI is intuitive for curators, but it is not intended for publishing general library news or complex portals. Greenstone is quite specialized: its usability is geared toward librarians building multi-format collections, including multimedia and many languages. It was shown to outperform others for multilingual, metadata-rich projects, but it is not suited as a general website CMS. In summary, our assessment finds that open-source CMS can meet most library needs, but each has strengths in particular niches. Training and support play a big role: a less technically-savvy staff may prioritize an easier CMS even if it means fewer features, whereas tech-savvy teams may leverage more powerful systems.

13. CMS Usage in Libraries: Some Examples

13.1 Indian Libraries: A prominent example is the National Digital Library of India (NDLI), hosted by IIT Kharagpur, which serves as a virtual repository of learning resources. The NDLI site is explicitly built on an open-source platform with multilingual content and free educational resources. It employs open-source components (likely Drupal or a similar stack) to manage over 35 million items in dozens of Indian languages (ndl.iitkgp.ac.in). Other Indian institutions follow this trend: many IIT libraries and major universities use open-source CMS for their library portals and digital libraries. For instance, Central Library, IIT Kharagpur, has adopted Drupal for its main site (library.iitkgp.ac.in).

Digital thesis repositories like Shodhganga (UGC's collection of Indian theses) use DSpace, enabling massive content management. Although detailed documentation is scarce, these portals illustrate the Indian library community's confidence in open-source CMS for large-scale projects (shodhganga.inflibnet.ac.in).

13.2. Global Library Portals: On the world stage, leading libraries also leverage open-source CMS. The British Library's Endangered Archives Programme (EAP) re-launched its site using Drupal. A Cogapp case study confirms, "Content is editable using Drupal, an open source content management system" (Cogapp, 2015). This enabled the British Library to present over six million archive images with a unified design and improved performance, all managed through

Drupal and Apache Solr search. Similarly, the Library of Congress employs open-source technology: it uses the Islandora framework (Drupal + Fedora Commons) to provide a unified portal for its special collections (as described in a case study on University of Nevada, Las Vegas (UNLV) archives, which parallels Library of Congress (LOC) approach. The LOC has embraced open-source for digital preservation and access (loc.gov). In Europe, the Europeana digital library framework partially relies on open-source tools. Europeana's main site uses a proprietary CMS (Contentful), but its stakeholder site "Europeana Pro" is built on Bolt CMS, an open-source PHP platform (europeana.eu)

This shows a hybrid use of open and closed source, but underscores that even large cultural heritage aggregators recognize the value of open-source CMS for community-driven platforms. Other examples include the CERN Document Server (CDS) and national libraries (e.g. National Library of Ireland uses Drupal). These cases demonstrate that institutions of all scales worldwide adopt open-source CMS to build robust, multilingual, and scalable library portals.

14. Conclusion

Open-source CMS have transformed library web presence by providing flexible, cost-effective, and user-driven solutions. Our comparative evaluation shows that no single system is ideal for all library scenarios. WordPress offers unmatched ease-of-use and community support, making it ideal for

content-rich library sites managed by general staff. Drupal provides depth and security for complex, large-scale portals, at the expense of requiring technical expertise. Joomla balances usability and power for medium-sized needs. Among library-centric tools, DSpace remains the repository workhorse, Omeka the accessible exhibit builder, and Greenstone a powerful multilingual digital library toolkit. Crucially, all these systems benefit from open-source communities, regular updates, and extensive documentation

In practice, many libraries use a combination - for instance, front-end CMS integrated with a DSpace for back-end repository. For libraries evaluating CMS, key recommendations are: match the CMS to your goals (usability vs feature-richness), involve actual users in testing, and leverage community resources for training. Case examples from India and abroad demonstrate that when chosen and implemented thoughtfully, open-source CMS yield highly usable, scalable library portals

Ultimately, the open-source model aligns well with library values of openness and collaboration, and when coupled with user-centric design, it enables libraries to deliver robust online services.

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