Technological Aspects of Open Journal Systems (OJS)

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Abstract

Open Journal Systems (OJS) has become a leading platform for scholarly publishing, enabling open-access (OA) journals worldwide. This paper delves into the technological aspects of OJS, examining its core functionalities, architecture, and key features through the lens of efficiency, flexibility, and accessibility (Ndungu, 2020)[2], (Hunter, 2010)[1]. The analysis of OJS's modular design emphasizes its capability to host multiple journals, manage submission workflows, and streamline science processes. The open-source nature of OJS provides empowerment for customization and integrations, enabling journals to tailor their publishing experience to specific needs and communities (R, Vijayan, & A.J, 2019)[4]. The examination delves into the role of plugins and themes in shaping journal appearances and functionalities, while also showcasing OJS's dedication to internationalization and multilingual support. In assessing OJS's technological strengths and limitations, the discussion centers on its impact on scholarly communication, addressing concerns related to security, scalability, and sustainability. Potential solutions are proposed, and the importance of community-driven development for OJS's ongoing evolution is underscored. OJS is a powerful and modern means of disseminating the results achieved in the field of education and science. Current patterns and architecture in modern web technologies are used in the mentioned system, the use of the patterns approaches is important and relevant (Tabatadze & Asanidze, 2023)[5]. This paper offers an analysis of the technological aspects of OJS, revealing its potential to reshape scholarly publishing landscapes. By empowering diverse voices and fostering global knowledge exchange, OJS demonstrates how technological innovation can drive the empowerment of scholarly communication.

Keywords: *Modern Technologies in Education, Science, Education, Open Journal Systems.*

Introduction

The traditional scholarly publishing landscape, dominated by large commercial publishers, has come under fire for high costs, limited access, and slow publication times. Open-source platforms are emerging as a powerful alternative, offering transparent, affordable, and accessible solutions for researchers to share their work with the world.

Open Journal Systems (OJS) stands out as a powerful and adaptable open-source platform designed for managing and publishing academic journals (Ndungu, 2020)[2]. The architecture of OJS is a critical factor in its widespread adoption and success. Here's a breakdown of key components:

Architecture:

- *Client-Server Model:* OJS employs a traditional client-server architecture, allowing web browsers to access the platform through the internet. This setup provides centralized control and administration while ensuring accessibility from any location.

- *Modular Design:* Built on a modular architecture, OJS features independent modules for various functionalities that can be added, removed, or customized as needed. This flexibility enables journals to tailor the platform according to their specific requirements.

- *Database-Driven:* OJS relies on a relational database, typically MySQL, for storing all journal data, promoting data integrity, and facilitating efficient searching and retrieval.

- *Open-Source Software:* Developed as open-source software, OJS offers freely available source code for modification and adaptation. This encourages a community of developers to continually enhance the platform and contribute plugins or extensions.

Technologies:

- *Programming Languages:* OJS core functionality uses PHP and JavaScript, complemented by technologies like CSS and HTML5 for enhancing the user interface.

- *Templating Engine:* OJS utilizes a templating engine, such as Smarty, for customizing the website's layout and branding without altering the core platform.

- *Workflow Plugins:* Numerous plugins extend OJS functionalities, covering areas such as peer review workflow management, plagiarism detection, and manuscript formatting.

- *Interoperability:* OJS integrates with various external systems, including indexing services, citation databases, and social media platforms, enhancing discoverability and reach.

Security and Reliability:

- *User Authentication and Authorization:* OJS employs secure user authentication and authorization mechanisms, controlling access based on user roles.

- *Data Backups and Disaster Recovery:* OJS supports automatic backups and disaster recovery mechanisms, safeguarding against data loss and ensuring platform uptime.

- *Security Updates and Patch Releases:* The development team actively releases security updates and patches, addressing vulnerabilities and maintaining platform stability.

Advantages of OJS's Technological Architecture:

- *Cost-Effective:* As open-source software, OJS eliminates licensing

costs, making it a cost-effective solution, particularly for journals in developing countries.

- *Scalability and Flexibility:* OJS can easily scale to accommodate varying journal sizes and workflows, thanks to its modular design allowing customization and integration with additional tools.

- *Community-Driven Development:* The open-source nature fosters a community of developers contributing to platform improvements and plugin development.

- *Transparency and Accessibility:* OJS's open-source code ensures transparency, promoting trust and accessibility.

Challenges and Future Directions:

- *Technical Expertise:* Implementation and maintenance of OJS may require technical expertise, potentially posing a barrier for some journals.

- *Security Vulnerabilities:* Being open-source makes OJS susceptible to vulnerabilities, necessitating constant vigilance and updates.

- *User Interface and Usability:* While improving, OJS's user interface may be complex for some users, requiring training and guidance.

Looking ahead, the future of OJS appears promising. Ongoing development focuses on improving the user interface, enhancing interoperability with other systems, and incorporating emerging technologies like artificial intelligence. With its robust architecture, flexibility, and community support, OJS is poised to remain a dominant platform for open-access publishing in the years to come.

Description of Core Functionalities of OJS

OJS, short for Open Journal Systems provides a comprehensive set of tools that simplify the entire publishing process, spanning from the submission of articles to their publication and subsequent archiving.

Let's delve into its primary functions:

Journal Setup and Administration: OJS empowers users to establish and personalize journal websites, create editorial boards, define user roles, establish submission guidelines, and proficiently manage journal settings.

Manuscript Submission and Review: It furnishes a well-organized platform for authors to submit manuscripts, editors to oversee the peer-review process, and reviewers to offer confidential feedback.

Publication and Accessibility: Once articles are approved, OJS facilitates their publication in various formats, such as HTML, PDF, and XML. It supports indexing in scholarly databases and offers versatile access choices, including open access, subscriptions, or hybrid models.

Content Discovery and Navigation: OJS ensures the easy discoverability of published content through search engines and within

the journal website. It provides user-friendly navigation and browsing features, including issue-based views, article-level metrics, and advanced search capabilities.

Website Design and Branding: The application allows users to customize the journal's appearance to align with its distinct identity and readership. Themes, layouts, and visual elements can be tailored to create an aesthetically pleasing and captivating online presence.

User Management and Communication: OJS proficiently handles user roles and permissions, ensuring secure access and safeguarding sensitive information. It facilitates communication between editors, authors, reviewers, and readers through email notifications and integrated messaging systems.

Statistics and Reports: The application generates detailed usage statistics and reports, offering valuable insights into journal performance, readership trends, and the impact of articles. This data aids in editorial decision-making and strategic planning.

Community Engagement: OJS nurtures a sense of community among journal stakeholders through interactive features like comments, forums, and integration with social media. It encourages scholarly exchange and supports the dissemination of knowledge within the academic community.

Multilingual Support: The software is designed to support multiple languages, enabling journals to reach a global audience and cater to diverse linguistic needs. This fosters international collaboration and facilitates knowledge sharing across borders.

Continuous Development and Support: OJS undergoes ongoing development and maintenance by the Public Knowledge Project (PKP), ensuring its stability, security, and alignment with evolving publishing standards. A global community of users and developers actively contributes to its growth and enhancement.

Classification of Software Plugins for OJS

Plugins are instrumental in enhancing the flexibility, functionality, and adaptability of OJS. They enable the platform to evolve, cater to diverse journal needs, and stay current with technological advancements in scholarly publishing. Plugins are so important for:

Customization and Extended Functionality: Plugins allow journals to customize and extend the functionality of OJS based on their specific needs. They provide a way to tailor the platform to suit the unique requirements of different journals and editorial workflows.

Enhanced Features and Tools: OJS plugins introduce additional features and tools that may not be present in the core system. These can include tools for plagiarism detection, alternative metrics, advanced indexing, or specialized submission workflows.

Adaptability to Diverse Journal Needs: Journals vary in their focus, scope, and editorial processes. Plugins enable OJS to be adaptable to the diverse needs of

different journals, ensuring that the platform can accommodate a wide range of scholarly publishing requirements.

Efficiency in Workflow Management: Workflow plugins enhance the efficiency of editorial processes. They can automate certain tasks, streamline peer review procedures, and facilitate manuscript tracking. This contributes to a more organized and time-effective publishing workflow.

Integration with External Services: Plugins facilitate integration with external services and tools, such as indexing databases, citation managers, or content delivery networks. This integration enhances the visibility of published content and improves the overall user experience.

Keep Pace with Technological Advances: The scholarly publishing landscape and technology evolve over time. Plugins enable OJS to adapt to these changes and incorporate new technologies. For example, plugins can be developed to integrate artificial intelligence tools or support emerging standards in scholarly communication.

Community Contribution and Collaboration: OJS being an open-source platform encourages community contributions. Developers from the community can create and share plugins, fostering collaboration and the exchange of ideas. This collaborative approach contributes to the continuous improvement of OJS.

Globalization and Multilingual Support: Plugins can be designed to enhance multilingual support and address localization needs. This is particularly important for journals that aim to reach a global audience, ensuring that the platform is accessible and user-friendly across different languages and regions.

Addressing Specific Challenges or Concerns: Some journals may have unique challenges or specific requirements. Plugins offer a way to address these challenges by providing tailored solutions. For instance, a plugin may be developed to address security concerns, improve accessibility, or enhance the platform's scalability.

Some commonly used plugins are listed:

➤ ORCID: This plugin integrates ORCID profiles to identify and link authors, enhancing author visibility and research impact.

➤ Altmetric: It showcases Altmetric badges to monitor article attention and impact across various online platforms.

➤ Google Analytics: This plugin provides insights into user behavior and content engagement by integrating website traffic analysis.

➤ Submission Checklist: Authors are guided through required steps during submission, ensuring completeness and adherence to journal guidelines.

➤ Reviewer Locator: Assists in finding suitable reviewers based on expertise, streamlining the peer-review process.

➤ Automated Emails: Streamlines communication with authors, reviewers, and editors, reducing manual tasks

and improving efficiency.

➤ Advanced Search: Enables comprehensive search filters and facets for refined results, facilitating better navigation and discovery of relevant content.

➤ Semantic Linking: It enhances content connections through semantic technologies, revealing relationships between articles and concepts.

➤ Article Recommendations: Users are provided with suggestions for related articles based on their interests, fostering exploration and knowledge discovery.

➤ Themes: It allows the adjustment of page layouts and content presentation, creating a unique and user-friendly experience.

➤ Layouts: Allows adjustment of page layouts and content presentation, creating a unique and user-friendly experience.

➤ Navigation: Enables modification of navigation menus and structures, promoting efficient website exploration and discoverability.

➤ Metadata: It adds custom metadata fields for enhanced article information, enriching data for search, indexing, and analysis.

➤ Multilingual Support: Expanding language options to reach a global audience, promoting international accessibility and knowledge sharing.

➤ Accessibility: This plugin improves the user experience for individuals with disabilities, following web accessibility guidelines and standards.

➤ Security: Enhances website security measures to protect against vulnerabilities and threats, ensuring data integrity and user privacy.

➤ Citation Managers: Integrates with popular citation management tools like Zotero or Mendeley, streamlining reference management and citation formatting.

➤ Indexing Services: Connects with indexing services like DOAJ or PubMed, increasing visibility and discoverability of journal content.

➤ Content Delivery Networks: Optimizes content delivery with CDNs for faster loading times and a smoother user experience.

➤ Emerging Technologies: This plugin explores features related to AI, blockchain integration, or other cutting-edge advancements, pushing the boundaries of scholarly publishing.

➤ Community Contributions: Discovers innovative plugins developed by OJS users, fostering collaboration and knowledge sharing within the community.

The use of plugins is one of the important aspects of the technological development of the existing OJS web platform. Plugins are easy and effective to use.

Conclusion

In summary, Open Journal Systems (OJS) exemplifies the impact of open-source software in promoting inclusivity within scholarly publishing. With its modular

structure and diverse array of plugins, OJS empowers journals to tailor and expand their functionalities, meeting varied requirements and nurturing a dynamic community of developers and users. As OJS adapts to technological progress, it stands ready to play a pivotal role in shaping the future of open access and equitable scholarly communication.

OJS can be considered an advanced and affordable technological tool for promoting science. It is a web platform developed with powerful functionality, and modern technologies, which develops daily in the conditions of a growing society.

Despite already boasting impressive features, OJS's embrace of emerging technologies opens up exciting avenues for further enhancement. Integrating AI-powered tools, blockchain solutions, and other innovative approaches can refine manuscript processing, elevate reviewer experiences, and personalize content delivery. By leveraging these technological advancements, OJS can streamline scholarly workflows, expedite knowledge dissemination, and contribute to a more transparent and inclusive publishing landscape.

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