

Evaluation of Data Journal Websites: A Usability and Content Analysis

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Abstract

Data journals are an important component of maximizing openness and scholarly sharing. These journals are effective primarily because of the quality and usability of their websites. Here, we use 15 criteria grouped into five categories as usability, author guidelines, data and open science characteristics, technical integration, and visibility indicators to evaluate seven selected data journal websites. Direct observation using a structured checklist was conducted to collect data, which was then analysed using frequency and percentage distribution. Results show that the majority of selected journals followed good practices like usability standards, open-access practice, DOI assignment, availability in metadata, and indexing regarding visibility. Nevertheless, some journals lack features such as advanced search capabilities, ORCID integration, and presence on social media. This confirms the need for journal platforms to remain scientifically effective and easy to use, in order to provide better discoverability, accessibility, and usability of research datasets. The results can potentially help publishers, researchers, and information professionals enhance the quality of data journal websites as information systems and reinforce scholarly communication practices.

Keywords: data journals, open science, scholarly communication, website evaluation.

Introduction: The scholarly communication landscape has changed rapidly in recent years, particularly with the rise of data-intensive research practices. The increasing attention to transparency, reproducibility, and the availability of research outputs has driven innovation in publishing models, including data journals. Data journals are incentivized journals that focus on data publishing and data descriptors, allowing researchers to share, repurpose, and validate research data (Candela et al., 2015).

More broadly, data journals fit within the larger concept of open science, which promotes not only open access to research publications but also to research data and methodologies. Around the world, open science initiatives have increased momentum to move researchers toward publicly sharing their data in support of greater collaboration and innovation (European Commission, 2016). Here, data journals are pivotal in establishing formal channels for the publication, citation and recognition of datasets.

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In contrast with classical scholarly journals, data journals care more about how datasets are well-documented and explained than theoretical or experimental results. This means making sure that datasets are curated, given global persistent identifiers (for example, DOIs), and described with proper metadata to improve both their findability and their reuse (M. Wilkinson et al., 2016). This also parallels the FAIR principles that data should be Findable, Accessible, Interoperable and Reusable. As the number of data journals worldwide increases, their sites are becoming the front end for researchers, authors and readers. Smooth access to datasets, submission processes, and author guidelines heavily relies on the usability and functionality of these websites. While well-designed websites improve the overall research experience, poor usability of evidence sites constitutes a barrier to data sharing and retrieval (Nielsen, 2012).

Although data journals play an increasingly significant role within the scholarly ecosystem, few studies have examined their online presence and their usability, content quality and technical characteristics. The bulk of other work looks at data sharing behaviors or research data management and relatively few, if any, examine evaluating data journal platforms.

Hence, the current research is designed to assess the selected data journal websites based on usability, content and technical aspects using some pre-defined parameters. It is anticipated that the results from this study will prepare a pathway for researchers, publishers, and library professionals to enhance the efficiency of data journal platforms.

Review of Literature

Data Journals and Scholarly Communication

Research data has become central to scholarly communication. (Boulton et al., 2011) which argued that scientific progress is dependent upon the availability and openness of research data, treating data as a public good. This viewpoint emphasizes the increasing need for organized mechanisms to disseminate and distribute datasets. He built on this idea to sketch out the legacies of scholarship in an age when data-intensive, big science research may no longer be able to use traditional journal articles as a model for dissemination (Greenberg, 2016). This insight highlighted the importance of new platforms for enabling data sharing and reuse. Expanding this idea, (Candela et al., 2015) proposed data journals as focused publishing venues for datasets that include rich metadata and annotations. These journals increase the visibility of data, make it possible to reuse them and they help with the formalization of data as a scholarly output. Collectively, these studies help anchor the place of data journals in the changing landscape of scholarly communication.

Open Science and Data Sharing Practices

Open science has been instrumental in developing the frameworks around how to share data nowadays. Open access is important for increasing the reach and impact of scholarly work, with a foundation for broader openness in research outputs (Bateman, 2006). Later, (European Commission, 2016) called on the essence of open science as a key to promote innovation, sharing and transparency among research communities. The report called for open access to both publications and research data, proposing that data are findable, accessible, interoperable and reusable (M. D. Wilkinson et al., 2016). These principles have been turned into a global

standard for evaluating data sharing platforms through data journals, which further solidify the value of structured data publication practices.

Website Usability in Scholarly Platforms

Website usability is one of the most significant factors in the overall effectiveness and usefulness of digital information systems. User-centered design is an essential principle of digital libraries, and usability is connected to the efficiency of information retrieval (Saracevic, 2000). Usability was initially regarded by (Nielsen, 2012) as defined as three main aspects: efficiency, effectiveness and user satisfaction, which led to a standard usability definition used in assessing web-based systems through the measure of web usage. His work basically gives clarity on how to design a user-friendly interface. Going a step further, alluded (Bawden & Robinson, 2022) observe that intuitive navigation, clear structure and mobile responsiveness generally increase user engagement with digital environments. All these studies express the significance of usability features for academic websites, and data journal platforms in particular.

Research Data Management and Role of Libraries

Research Data Management has become one of the fundamental components to be considered in modern research practices. Although there is willingness to share data, there are many ongoing challenges such as lack of infrastructure and support. Institutional frameworks and policies are required to facilitate good data management and preservation. The study also emphasized the value of standardized practices to enable long-term access to data. There is great importance of libraries and information professionals who provide RDM services such as data curation, metadata creation and repository management. These contributions highlight how data journals can work in tandem with RDM efforts and the role of open access to data in addressing infrastructural challenges.

There is a significant amount of literature on open science, data sharing and research data management, but there have been few studies until now that evaluate the websites of these new types of journals. While the majority of previously published studies on repositories for Open Access publishing tend to be related to journals in general, there has been less research into usability, technical components and data journal stakeholders looking into how a data journal platform affords data-specific functionalities. This establishes the necessity of assessing data journal websites from functional, content and technological perspectives, which is part of what this study does.

Objectives of the Study

The main objectives of the study are:

- To investigate key characteristics of specific data journal sites.
- To assess the usability of data journal websites.
- To analyse features of content and data related to these platforms.
- To compare standard-based selected data journals

Research Methodology

This paper uses an evaluative research design to evaluate selected data journal websites with a focus on usability, content quality, technical integration, and open science practices. For the study, seven data journals were purposively sampled based on their prominence in scholarly data publishing, international recognition, and the relevance of maintaining open science efforts. Journals of interest: Scientific Data (Springer Nature, 2014), Data in Brief (Elsevier, 2014), Earth System Science Data (Copernicus Publications, 2009), Biodiversity Data Journal (Pensoft Publishers, 2013), Journal of Open Psychology Data (Ubiquity Press, 2013), Geoscience Data Journal (Wiley, 2014) and Data Science Journal (CODATA, 2002). In addition to subject-specific domains such as environmental sciences, biodiversity and psychology, these encompass multidisciplinary oralities in geosciences and information science.

A checklist method was used for data collection. The checklist included fifteen assessment categories divided into five major groups.

- Usability Features- Navigation, Search, load speed and mobile friendliness.
- Author Guidelines-Submission guidelines, support for data submission and metadata.
- DOI and other data citation support features: licensing information, open access.
- Technical Features- Integration with ORCID and linking repository.
- Visibility, such as indexing support and a social presence.

Feature existence was scored with 1, whereas its absence was assigned a score of 0. This binary scoring provided a more objective assessment and allowed for comparison between all the journal websites reviewed. In the course of the study, data were collected by means of direct observation and systematic review of selected journals' official websites. Data were compiled into a table format and analyzed using frequency and percentage distribution methods to give insights into the prevalence of particular characteristics, as well as any potential strengths or weaknesses attributable to the data journal platforms chosen.

Descriptive interpretation of findings was made to assess the overall completeness, openness, usability and journal performance on scholarly communication from the websites of selected data journals. The research only analyzes a subset of international data journals and examines only observable website features present at the time of analysis.

Data Analysis and Interpretation

Usability

From Table 1, it is seen that all the data journal websites selected are navigable, have a reasonable loading speed and are mobile-supported, thus obtaining 100% availability. These characteristics suggest that the journals reviewed meet contemporary usability expectations and facilitate a seamless user experience across devices. While six journals offer search functionality (85.71%), only one does not. Search is a useful functionality for easily retrieving and discovering datasets. This feature can make it difficult for users to find datasets that they

are looking for. In conclusion, the results indicate that the chosen data journals offer good usability performance.

Table 1: Distribution of usability features across selected data journals

S.No.	Features	Data Journals							Frequency	Percentage
		Scientific Data	Data in Brief	Earth System Science Data	Biodiversity Data Journal	Journal of Open Psychology	Geoscience Data Journal	Data Science Journal		
1.	Ease of Navigation	1	1	1	1	1	1	1	7	100%
2.	Search Functionality	1	1	1	1	0	1	1	6	85.71%
3.	Loading Speed	1	1	1	1	1	1	1	7	100%
4.	Mobile Friendliness	1	1	1	1	1	1	1	7	100%

Author Guidelines

All selected journals provide complete author support services (submission guidelines, data submission instructions and metadata requirements), shown in table 2 as 100 percent availability.

Having precise metadata standards provides a description of the datasets and increases the findability, interoperability, and reuse of research data. Results: The results reveal a high degree of standardization of the submission framework across all selected journals, suggesting a journal with a serious commitment to quality scholarly communication.

Table 2: Availability of author guideline features

S.No.	Features	Data Journals							Frequency	Percentage
		Scientific Data	Data in Brief	Earth System Science Data	Biodiversity Data Journal	Journal of Open Psychology	Geoscience Data Journal	Data Science Journal		
1.	Submission Guidelines	1	1	1	1	1	1	1	7	100%

2.	Data Submission	1	1	1	1	1	1	1	7	100%
3.	Metadata Requirements	1	1	1	1	1	1	1	7	100%

Data and Open Science Features

Table 3 shows that all selected journals provide DOI assignment, data citation support, licensing information and availability in open access.

DOI assignment guarantees permanent dataset identification and citation, while licensing ensures legal reuse and accessibility. Also, open-access availability will reflect their commitment to strong adherence to FAIR data principles and open science/training practices. It provides evidence that the selected journals support a mature and established scholarly data-sharing ecosystem.

Table 3: Open science compliance indicators

S.No.	Features	Data Journals							Frequency	Percentage
		Scientific Data	Data in Brief	Earth System Science Data	Biodiversity Data Journal	Journal of Open Psychology Data	Geoscience Data Journal	Data Science Journal		
1.	DOI	1	1	1	1	1	1	1	7	100%
2.	Data Citation	1	1	1	1	1	1	1	7	100%
3.	Licensing	1	1	1	1	1	1	1	7	100%
4.	Open Access	1	1	1	1	1	1	1	7	100%

Technical Features

As shown in Table 4, linkage to repositories is facilitated by six journals (85.71%), and integration with ORCID is offered for five (71.43%) of the journals reviewed.

This feature is important for scholarly sustainability but requires technical support such that datasets can be linked and preserved in a repository over the long term. ORCID integration provides an author identifier and helps tracking who wrote what in scholarly articles. The two journals that did not integrate ORCID could face limitations in interoperability as well as with researcher visibility across the scholarly communication ecosystem.

Table 4: Technical feature implementation

S.No	Features	Data Journals							Frequency	Percentage
		Scientific Data	Data in Brief	Earth System Science Data	Biodiversity Data Journal	Journal of Open Psychology	Geoscience Data Journal	Data Science Journal		
1.	ORCHID Integration	1	1	1	1	0	1	0	5	71.43%
2.	Repository Linkage	1	1	1	1	1	1	0	6	85.71%

Visibility Features

Table 5 confirms that all the chosen journals are indexed in well-known academic databases, which means that 100 percent of research articles are available, guaranteeing high discoverability and visibility to the community.

Social media presence was appraised in six journals (85.71%) with five (71.43%) reports having an active social media presence while two of the reports did not. Social media platforms help in achieving both scholarly dissemination and user engagement. Limited social media integration may hamper outreach and exposure to the wider research community

Table 5: Social media visibility of selected data journals

S.No	Features	Data Journals							Frequency	Percentage
		Scientific Data	Data in Brief	Earth System Science Data	Biodiversity Data Journal	Journal of Open Psychology	Geoscience Data Journal	Data Science Journal		
1.	Indexing Support	1	1	1	1	1	1	1	7	100%
2.	Social Media Presence	1	1	1	1	0	1	0	5	71.43%

The general results further confirm that the majority of data journal sites comply well with usability, open science and technical interoperability standards. Out of all journals evaluated, Scientific Data, Data in Brief, Earth System Science Data and Biodiversity Data Journal and Geoscience Data Journal implemented the majority of features. Data Science Journal supported

moderate technical integration with ORCID and social media presence, but Journal of Open Psychology Data lacked certain visibility and search-related functionalities. Study results indicate that the journals reviewed predominantly affirm principles of contemporary scholarly communication, effectively encouraging open access to datasets in a format conducive to discovery and reuse.

Suggestions

The following recommendations are made based on findings of the study:

- Provide modern search functions across all data journal websites, enabling easier discovery of datasets.
- Journals that do not already integrate with ORCID should put in place systems for researcher identification to provide them broader scholarly visibility and interoperability.
- Strengthen the role of social media in outreach and scholarship.
- Long-term curation and access to datasets should be enabled in all data journals, via repository linkage
- Journal sites require regular updates for data, technical efficiency and user experience.

Conclusion

Seven selected data journal websites (based on indications of usability, author support, open science compliance, technical integration and visibility) were evaluated regarding the set criteria in the present study. The data show that the majority of the journals chosen comply quite well with modern scholarly publishing standards through easy-to-use functionalities, thorough author guidance, DOI assignment, open access, and institutional repository support.

The study also notes that while the journals are mostly successful, there is still some room for improvement in search functions, ORCID integration, and visibility on social. Improving these domains will further improve scholarly communication with the hopes of widespread success in sharing research data.

In summary, data journal websites are thought-provoking tools: they become important mechanisms to support and ensure that the scholarly digital ecosystem provides research data in a transparent, discoverable, and reusable way.

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