Developing Open Access Institutional Digital Repository Using Open Source Software: A Step by Step Guide

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Abstract

Reports the designing and development of an open access (OA) institutional digital repository (IDR) model (BURA – Burdwan University Research Archive) using DSpace software (http://www.dspace.org/). Describes various steps involved in administering DSpace like creating and maintaining Communities, Sub-communities and Collections under community/sub-community etc. Also demonstrates different steps involved in submission process and proposes incorporation of subject access system (here DDC-Dewey Decimal Classification) in IDR system to fulfill the subject approach of the users.

Keywords: Open Access, Open Access Repository, Digital Archive, Open Source Software, Subject Access System, DDC, Controlled Vocabulary

1. Introduction

Academic institutions specially universities and research organizations both public and private have been generating knowledge objects in the form of articles, conference reports, theses and dissertations, teaching materials etc. But there is no such mechanism by which these public funded research outputs could be preserved in one place in digital form for perpetual access. The Open Citation Project\(^1\) reported that about 80-85% of digital intellectual outputs of universities are not accessible due to the absence of proper mechanism. In this context, institutional digital repositories (IDRs) have emerged as an alternative publishing platform to the academic world. The paper presents a model OAR based on open standard and open source software and describes methodology of creating community/sub-community or collection (under any community).
2. Review of Literature
The history of institutional digital repositories (IDRs) is relatively short, with the first discipline based repository (ArXiv) being implemented in the early ‘90s. The repository movement started spreading worldwide after the release of three declarations viz. Budapest (http://www.soros.org/openaccess/read.shtml), Berlin (https://openaccess.mpg.de/Berlin-Declaration) and Bethesda (http://www.earlham.edu/~peters/fos/bethesda.htm), popularly known as the 3Bs, and different open source repository software. Another two related events in the area of open source software (OSS), viz., release of EPrints and DSpace made the repository movement fast and several institutions all over the world started developing IDR using OSS. During 2007-2017, authors conducted a number of studies focusing on current status of OAR on specific country such as in India, Europe, and North America as well as in different subjects such as agriculture, and library and information science. Several other authors have discussed and shared their practical experiences in designing and maintaining IDR system of their own institution using open source software (OSS). Another study described design and development of a digital library at Cochin University of Science and Technology (CUSAT) using DSpace. Biradar & Banatepanavar also shared experience of developing IDR using DSpace at Kuvempu University. Singh & Pandita described development of digital repository for the biomedical sciences at National Informatics Centre. Kumar focused on establishment of institutional mechanism for building national repository in health science. Some other experts reported that many academic and research establishments have made it mandatory to set up IRs using OSS. In recent studies, authors reported the development of a metadata harvesting model using PKP2 software within the framework of IDR. In another paper, they discussed the necessity of using subject access system in IDR in order to fulfill the subject approach of the users.

3. Creation of Community
Administrator can log into DSpace by entering following URL in the browser http://<domain/IP>:8080/dspace/dspace-admin (Fig. 1).

![Log in as Administrator](image)

Fig. 1: Log in as Administrator

The moment repository administrator clicks on ‘Communities/Collections’ button (Fig. 2) at the top left corner of the window, another window (Fig. 3) will display from where new Community can be created after clicking on ‘Create Top Level Community’.
And finally ‘Create’ button can be clicked to have the new Community (Fig. 4).
4. Creation of Sub-Community

The moment administrator clicks on the ‘Create Sub-community’ button (Fig. 5) after selecting appropriate Community (here Faculty of Arts and Humanities), the subsequent window (Fig. 6) will display another window.
And the button ‘create’ (Fig. 6) can be clicked to have the sub-community (here Department of Library and Information Science).

5. Deletion of Community

In the same way like creating Community in section, it can be deleted by clicking on ‘Edit’ button from Admin Tools box (Fig. 7).

The moment administrator clicks on ‘Delete this Community’ button (Fig. 8) the system displays another window (Fig. 9) and finally clicking of ‘Delete’ button automatically deletes it.
5. Creation of Collection

Collection can be created by clicking on second option ‘Create Collection’ from Admin Tools box at the top right hand corner of the window (Fig. 10).
6. Submission Process

Submission can be done by logging into the ‘My DSpace’ and clicking on the ‘Start a New Submission’ button (Fig. 11). It is to be remembered that only authorized user can submit to that particular collection if he/she is entitled to do so.

The interface (Fig. 12) displays all the collections a submitter is authorized to submit and is supported by drop down menu lists from where the submitter can select the desired collection.
The subsequent window (Fig. 13) allows submitter to enter metadata in required fields one-by-one. The button ‘Next’ button can be clicked once it is done.

7.1 Submission Interface
DDC (Dewey Decimal Classification) has been incorporated in this software framework and submitter can select controlled metadata from DDC apart from generating metadata manually. Submitter can view all top level subjects and its subdivisions in English (Fig. 14) as well as in Bengali (Fig. 15) organized as per DDC. The plus sign (+) indicates that category has sub-categories and/or links to resources under it. A click on the ‘+’ sign expands hierarchy under categories and sub-categories of DDC.

![Fig. 14: Submission Form (selection of subjects categories – English)](image)

![Fig. 15: Submission form (selection of subjects categories - Bengali)](image)

7.2 License Agreement

Another legal matter in developing IDR system is granting license. Anybody can use default license as with the repository software or can use other licenses such as MIT license, CC license, Apache license available in the open source domain or can make
their own license as per the requirements of the institutions. Finally button ‘I grant the License’ (Fig. 16) can be clicked to complete the submission process.

![Fig. 16: Granting License](image1)

After granting the license, the item will go to the repository administrator (Fig. 17).

![Fig. 17: Submission Completed](image2)
Once the submission is completed, item enters into the BURA work flow and E-people involved in work flow process will be notified to take the task (Fig. 18).

![Fig. 18: Tasks in the Pool](image)

Once, it is accepted (Fig. 19), it will go for approval (Fig. 20).

![Fig. 19: Preview task](image)
Fig. 20: Perform Tasks in the Pool

And finally, the item will get a handle (Fig. 21) and will be visible to all.

Fig. 21: Submission Approval

9. Conclusion

This study proposes a model IDR based on open standards and OSS which could be implemented in any organization. An attempt has been made to incorporate subject access mechanism in order to fulfill the subject approach of the user community. This prototype may help policy makers, administrators in devising IDR system for their own organization. Organizational needs are too diverse, but this Web-enabled distributed
system may work as an alternative publishing platform to the academicians in order to showcase their research outputs globally.

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