

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

Dr. Bijan Kumar Roy

Assistant Professor,
Dept. of LIS, The University of Burdwan,
West Bengal, India
bjankumarroy@yahoo.co.in

Dr. Parthasarathi Mukhopadhyay

Associate Professor,
Dept. of LIS, The University of Kalyani,
West Bengal, India
psmukhopadhyay@gmail.com

Dr. Subal Chandra Biswas

Professor,
Dept. of LIS, The University of Burdwan,
West Bengal, India
scbiswas_56@yahoo.co.in

Dr Rajesh Das

Assistant Professor,
Dept. of LIS,
The University of Burdwan,
West Bengal, India
rajeshdas99@gmail.com

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

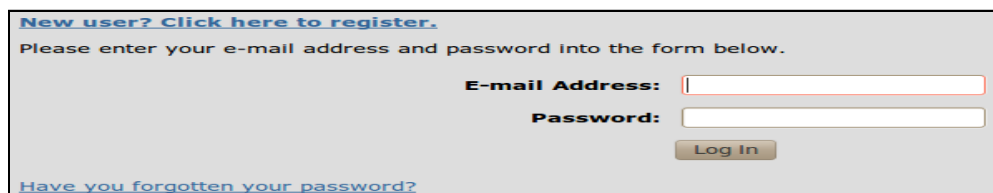
Academic institutions specially universities and research organizations both public and private have been generating knowledge objects in the form of articles, conference reports, theses and dissertations, teaching materials etc. But there is no such mechanism by which these public funded research outputs could be preserved in one place in digital form for perpetual access. The Open Citation Project¹ 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 OSS²⁻³. During 2007-2017, authors conducted a number of studies focusing on current status of OAR on specific country such as in India⁴⁻¹², Europe¹³, and North America¹⁴ as well as in different subjects such as agriculture¹⁵, and library and information science¹⁶. Several other authors¹⁷⁻²⁶ have discussed and shared their practical experiences in designing and maintaining IDR system of their own institution using open source software (OSS). Another study²⁷ described design and development of a digital library at Cochin University of Science and Technology (CUSAT) using DSpace. Biradar & Banateppanavar²⁸ also shared experience of developing IDR using DSpace at Kuvempu University. Singh & Pandita²⁹ described development of digital repository for the biomedical sciences at National Informatics Centre. Kumar³⁰ focused on establishment of institutional mechanism for building national repository in health science. Some other experts³¹ reported that many academic and research establishments have made it mandatory to set up IRs using OSS. In recent studies, authors³²⁻³³ 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 IDR³⁴ 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).



New user? [Click here to register.](#)
Please enter your e-mail address and password into the form below.
E-mail Address:
Password:

[Have you forgotten your password?](#)

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'.

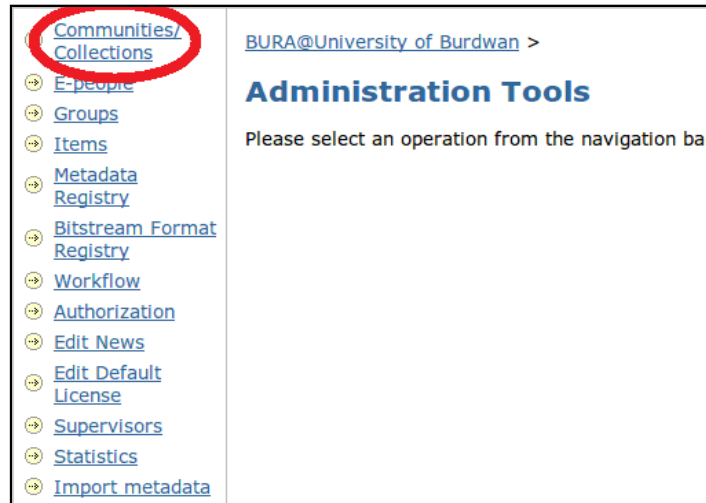


Fig. 2: Community creation



Fig. 3: Community creation

And finally 'Create' button can be clicked to have the new Community (Fig. 4).

Create Community

Name: Faculty of Arts and Humanities

Short Description BURA (Burdwan University Research Archive)

Introductory text (HTML):

Copyright text (plain text):

Side bar text (HTML):

Logo: Upload a logo...

Create Cancel

Fig. 4: Community creation

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.

Logged in as dspace@localhost (Logout)

BURA@University of Burdwan >

Faculty of Arts and Humanities

Community home page

Admin Tools

Edit...

Create collection

Create Sub-community

Export Community

Export (migrate) Community

Export metadata

Admin Help...

Recent Submissions

Search DSpace

Advanced Search

Home

Browse

Communities & Collections

In: Faculty of Arts and Humanities

Search for

Go

or browse

Subject Title Author Issue Date

Fig. 5: Creation of Sub-community

And the button ‘create’ (Fig. 6) can be clicked to have the sub-community (here *Department of Library and Information Science*).

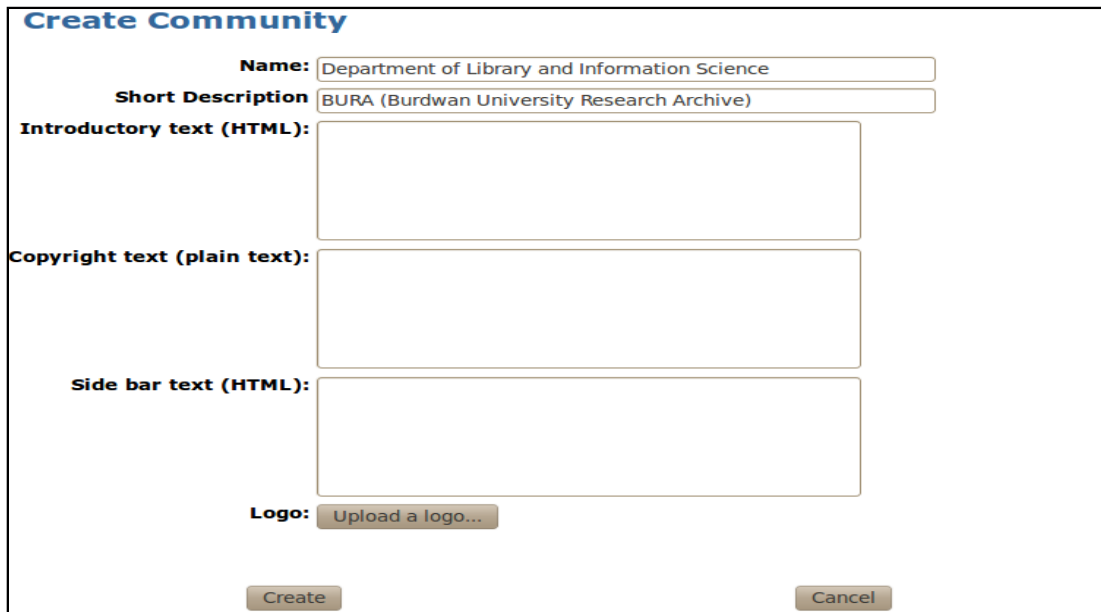


Fig. 6: Creation of Sub-community

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).

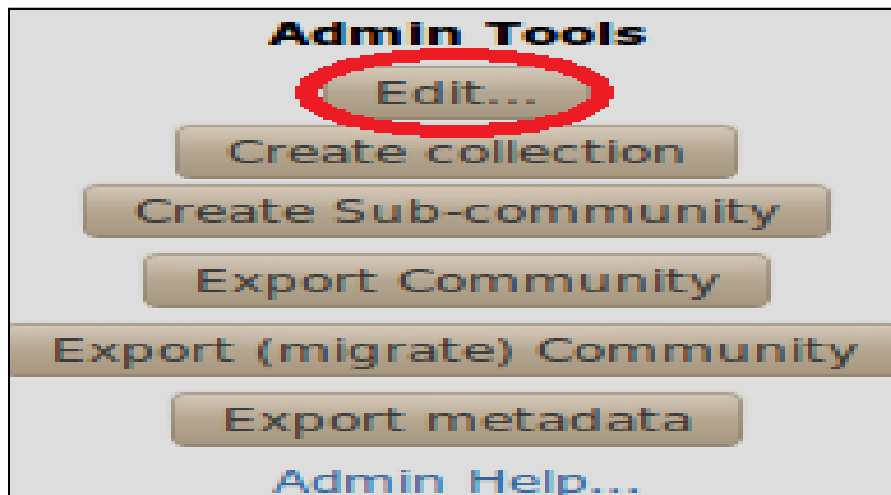


Fig. 7: Community deletion (step 1)

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.

Edit Community 123456789/1

Delete this Community...

Name: Faculty of Arts and Humanities

Short Description: BURA (Burdwan University Research Archive)

Introductory text (HTML):

Copyright text (plain text):

Side bar text (HTML):

Logo: Upload a logo...

Community Administrators: Create

Community's Authorizations: Edit...

Update

Fig. 8: Community deletion (step 2)

BURA@University of Burdwan >
Administer >

Delete Community: 1

Are you sure the community **Faculty of Arts and Humanities** should be deleted? This will delete:

- Any collections in the community that are not contained in other communities
- Any items and incomplete submissions in those collections that aren't contained in other collections
- The contents of those items
- All associated authorisation policies

Delete Cancel

Fig. 9: Community deletion (step 3)

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).



Fig. 10: Collection creation under Community/Sub-Community

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.



Fig. 11: Submission Interface

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.

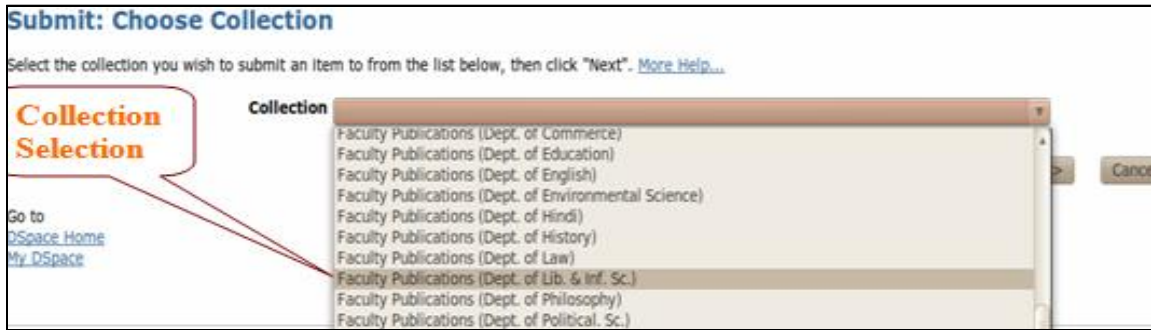


Fig. 12: Selection of Collection

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.

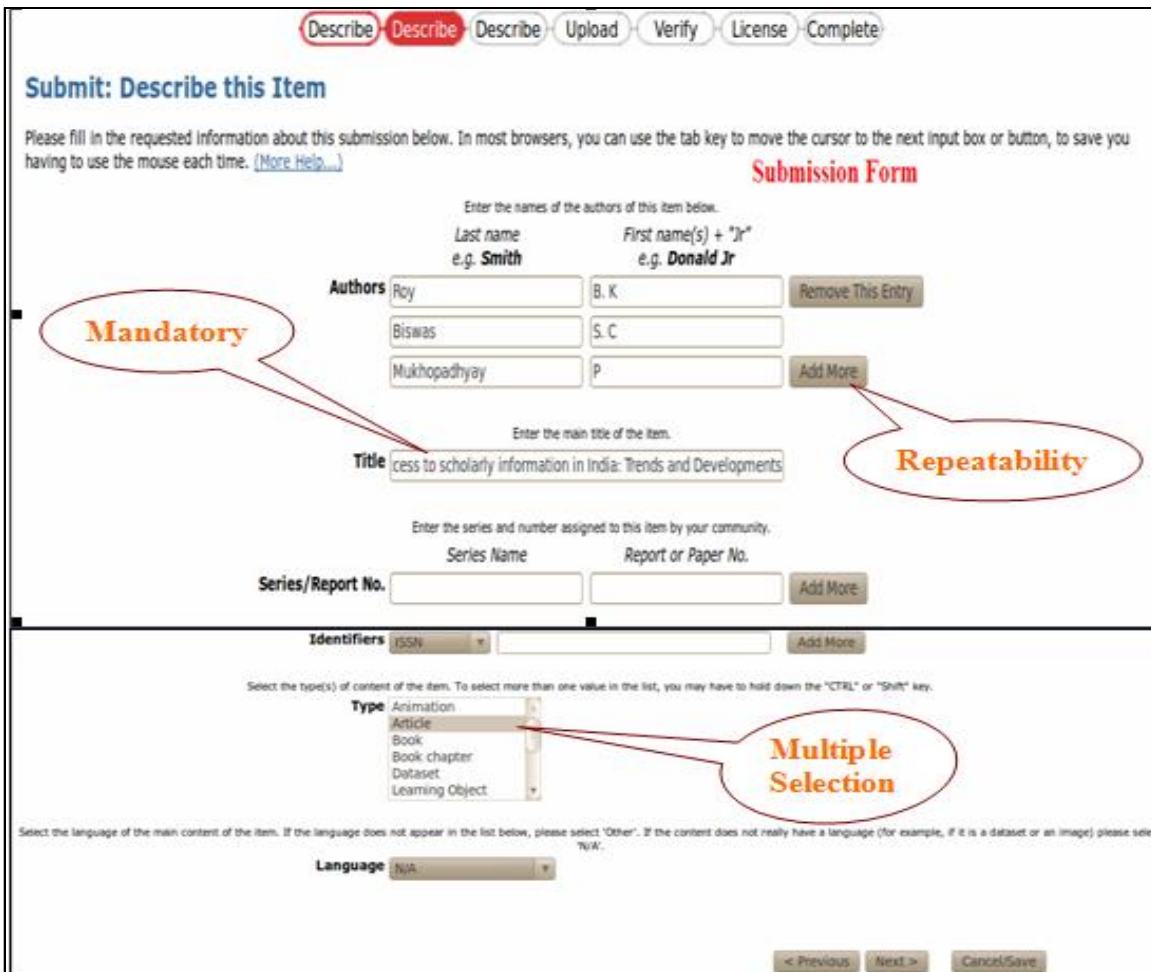


Fig. 13: Submission Form

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)

Fig. 15: Submission form (selection of subjects categories - Bengali)

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.

Describe Describe Describe Upload Verify License Complete

There is one last step: In order for DSpace to reproduce, translate and distribute your submission worldwide, your agreement to the following terms is necessary. Please take a moment to read the terms of this license, and click on one of the buttons at the bottom of the page. By clicking on the "Grant License" button, you indicate that you grant the following terms of the license. [More Help...](#)

Not granting the license will not delete your submission. Your item will remain in your "My DSpace" page. You can then either remove the submission from the system, or agree to the license later once any queries you might have are resolved.

BURDMAN UNIVERSITY RESEARCH ARCHIVE (BURA) LICENSE FOR SUBMITTED IPR

NON-EXCLUSIVE DISTRIBUTION LICENSE

By signing and submitting this license, you (the author(s) or copyright owner) grants to Burdwan University Research Archive (BURA) the non-exclusive right to reproduce, translate (as defined below), and/or distribute your submission (including the abstract) worldwide in print and electronic format and in any medium, including but not limited to audio or video.

You agree that BURA may, without changing the content, translate the submission to any medium or format for the purpose of preservation.

You also agree that BURA may keep more than one copy of this submission for purposes of security, back-up and preservation.

You represent that the submission is your original work, and that you have the right to grant the rights contained in this license. You also represent that your submission does not, to the best of your knowledge, infringe upon anyone's copyright.

If the submission contains material for which you do not hold copyright, you represent that you have obtained the unrestricted permission of the copyright owner to grant BURA the rights required by this license, and that such third-party owned material is clearly identified and acknowledged within the text or content of the submission.

IF THE SUBMISSION IS BASED UPON WORK THAT HAS BEEN SPONSORED OR SUPPORTED BY AN AGENCY OR ORGANIZATION OTHER THAN BURA, YOU REPRESENT THAT YOU HAVE FULFILLED ANY RIGHT OF REVIEW OR OTHER OBLIGATIONS REQUIRED BY SUCH CONTRACT OR AGREEMENT.

BURA will clearly identify your name(s) as the author(s) or owner(s) of the submission, and will not make any alteration, other than as allowed by this license, to your submission.

BURDMAN UNIVERSITY RESEARCH ARCHIVE (BURA) LICENSE FOR SUBMITTED IPR

I Grant the License

I Do Not Grant the License

Fig. 16: Granting License

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

Describe Describe Describe Upload Verify License Complete

Submit: Submission Complete!

Your submission will now go through the workflow process designated for the collection to which you are submitting. You will receive e-mail notification as soon as your submission has become a part of the collection, or if for some reason there is a problem with your submission. You can also check on the status of your submission by going to the My DSpace page.

[Go to My DSpace](#)

[Communities and Collections](#)

Submit another item to the same collection

Fig. 17: Submission Completed

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).

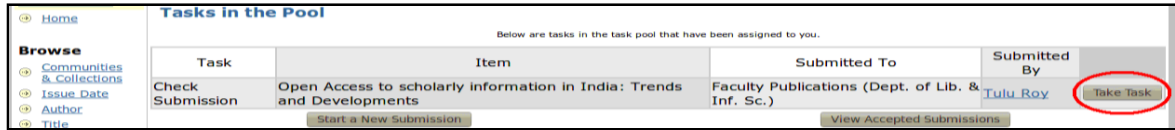


Fig. 18: Tasks in the Pool

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

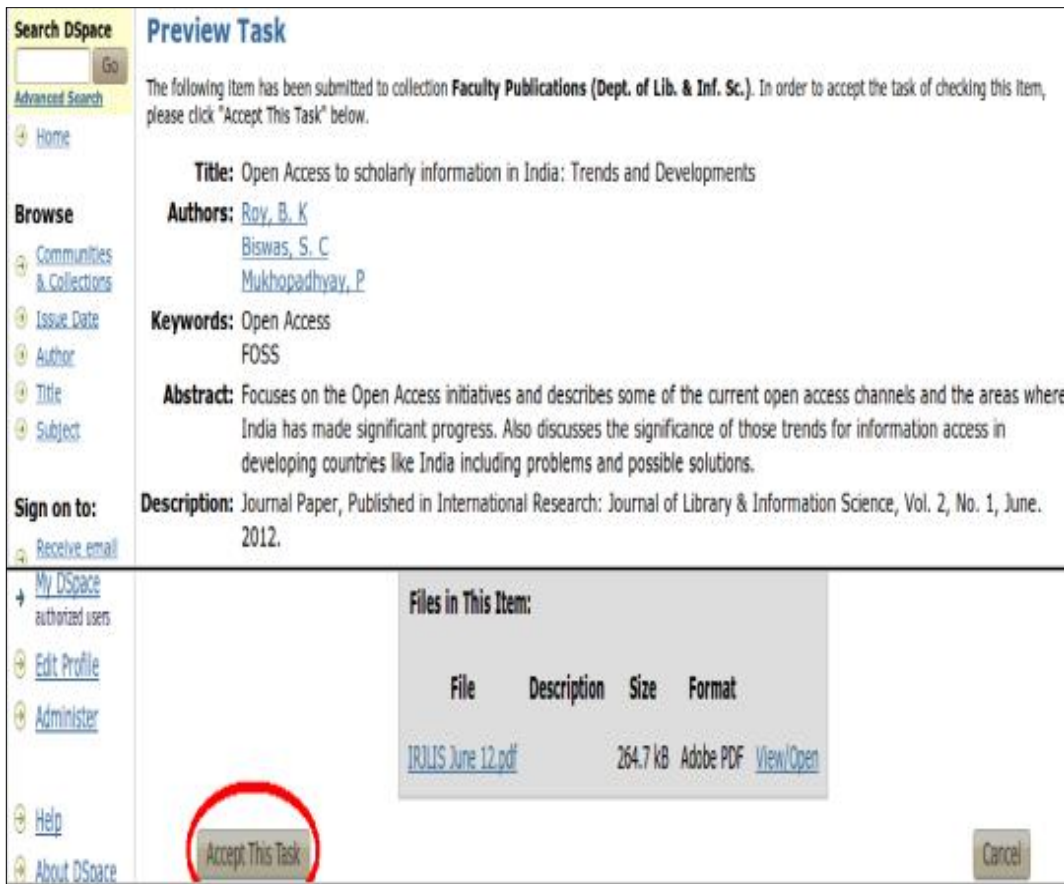


Fig. 19: Preview task

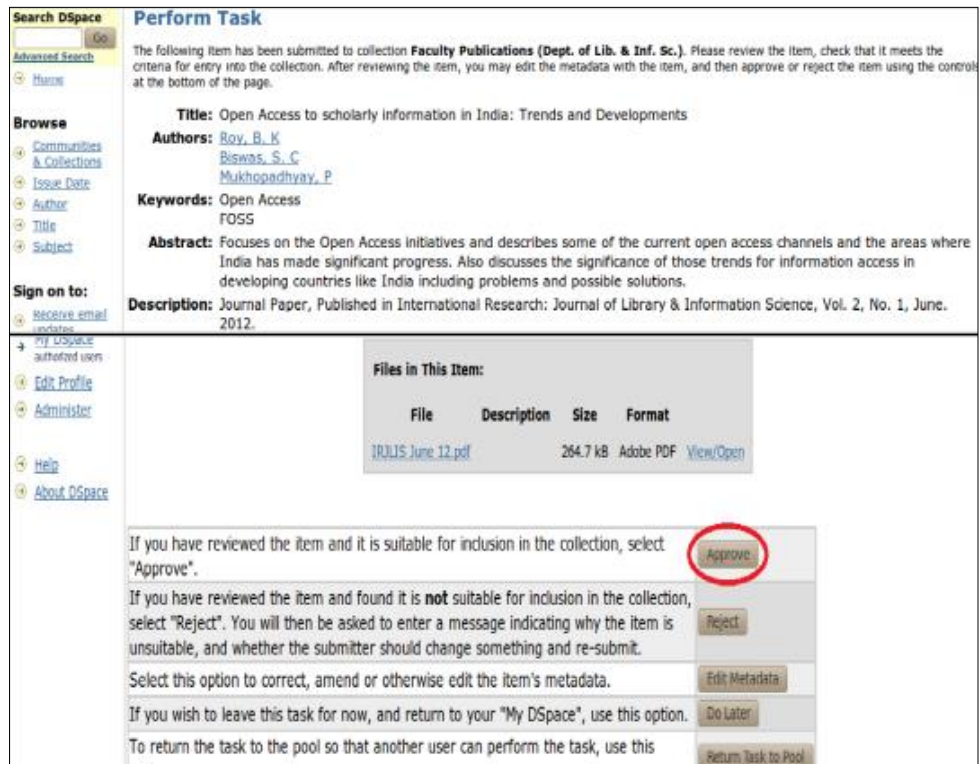


Fig. 20: Perform Tasks in the Pool

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

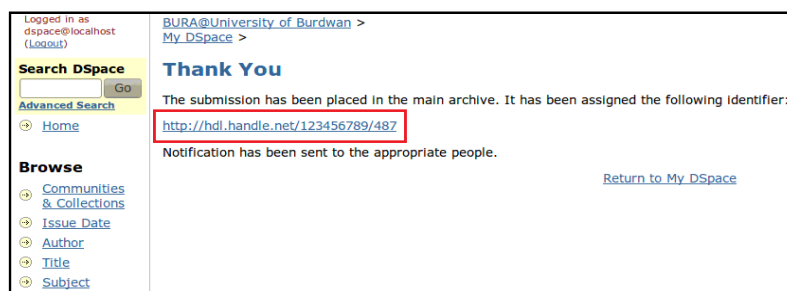


Fig. 21: Submission Approval

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.

References

1. <http://opcit.eprints.org/oacitation-biblio.html>. (Visited on: Mar 17, 2016)
2. ROY (B K). *Designing institutional digital repository for the University of Burdwan: a FLOSS based prototype*. University of Burdwan, India. PhD Thesis. 2014. p 277-296 (unpublished).
3. ROY (B K). *Institutional digital repository: from policy to practice*. 2015. LAP; Saarbrücken, Germany.
4. ROY (B K). Indian initiatives in the development of institutional digital repository. *Digital Media and Library Information Services: XXVI IASLIC Conference*, Jamia Millia Islamia University, New Delhi, December 26-27, 2007. IASLIC; Kolkata. 2007. p 253-262.
5. ROY (B K). open access trends and developments in India. *Librarian*, 17; 2010, p 83-87.
6. ROY (B K). Open access repository: an alternative model for scholarly communication. In G. Maity & Others, *Charaibeti: Golden Jubilee Commemorative Volume*. 2014. Kolkata: Jadavpur University. p 250 – 257.
7. ROY (B K) and MUKHOPADHYAY (P). Development of learning objects repositories in India. *Open Access: Gateway to Open Innovation, Proceedings of the 27th Annual Conference of the Society for Information Science* (November 24-27, 2010, Kolkata) (pp. 179-187). New Delhi: Society for Information Science.
8. ROY (B K), BISWAS (S C) and MUKHOPADHYAY (P). An analytical study of institutional digital repositories in India. *Library Philosophy and Practice*. 2012, (Paper 692).
9. ROY (B K), BISWAS (S C) and MUKHOPADHYAY (P). Open access repositories in Asia: from SAARC to Asian tigers. *Library Philosophy and Practice*. 2012, (Paper 808).
10. ROY (B K), BISWAS (S C) and MUKHOPADHYAY (P). Study of open access repositories: a global perspective. *Information-Innovation-Technology: Creating Seamless Linkages, 29th Convention & Conference of Society of Information Science* (November 26 - 28, 2012, Silchar). Silchar: National Institute of Technology.
11. ROY (B K), BISWAS (S C) and MUKHOPADHYAY (P). Global visibility of Indian open access institutional digital repositories. *International Research: Journal of Library & Information Science*. 3, 1; 2013, p 182-194.
12. ROY (B K), BISWAS (S C) and MUKHOPADHYAY (P). Open access repositories for Indian universities: towards a multilingual framework. *IASLIC Bulletin*, 61, 4; 2016, p 150-161.
13. ROY (B K), BISWAS (S C) and MUKHOPADHYAY (P). Trends and developments of open access repository movement in Europe. *International Research: Journal of Library and Information Science*, 5, 3; 2015, p 407-422.
14. ROY (B K), BISWAS (S C) and MUKHOPADHYAY (P). The COAPI cats: the

- current state of open access repository movement and policy documentations. *International Journal of Knowledge Content Development & Technology*. 6, 1; 2016, p 69-84.
15. ROY (B K), BISWAS (S C) and MUKHOPADHYAY (P). Status of open access institutional digital repositories in agricultural sciences: a case study of Asia. *Library Philosophy and Practice*. Paper 1329.
 16. ROY (B K), BISWAS (S C) and MUKHOPADHYAY (P). Global repository movement in the domain of library and information science. *International Journal of Information Science and Management*. 14, 2, 2016, p 15-32.
 17. ANURADHA (K T). Design and development of institutional repositories: a case study. *The International Information and Library Review*. 37, 3; 2005, p 169-178.
 18. DOCTOR (G). Knowledge sharing: developing the digital repository of SIPS. *VINE: The Journal of Information and Knowledge Management Systems*. 37, 1; 2007, p 64-73.
 19. DOCTOR (G) and RAMACHANDRAN (S). DSpace@IBSA: knowledge sharing in a management institute. *VINE: The Journal of Information and Knowledge Management Systems*. 38, 1; 2008, p 42-52.
 20. JAYAKANTH (F), MINJ (F), SILVA (U) and JAGIRDA (S). ePrints@IISc: India's first and fastest growing institutional repository. *OCLC Systems & Services*. 24, 1; 2008, p 59-70.
 21. KRISHNAMURTHY (M). Digital library of mathematics using DSpace: a practical experience. *SRELS Journal of Information Management*. 42, 3; 2005, p 245-256.
 22. KRISHNAMURTHY (M) and KEMPARAJU (T D). Institutional Repositories in Indian Universities and Research Institutes: A Study. *Program: Electronic Library and Information Systems*, 45, 2; 2011, p 185-198.
 23. NARANG (S) and Others. Creating health sciences theses institutional Repository model: An approach at AIIMS, New Delhi, India. *Proceedings of 8th International Symposium on Electronic Thesis & Dissertations*. University of New South Wales, Sydney, Australia, September 28- 30, 2005. USA: NDLTD.
 24. SHEWALE (N). Building Digital Library using DSpace: Case Study of GIPE's Dhananjayarao Gadgil Digital Library. *DESIDOC Journal of Library & Information Technology*, 32, 5; 2012, p 417-420.
 25. SINGH (S), PANDITA (N) and DASH (S S). Opportunities and challenges of establishing open access repositories: a case study of OpenMED@NIC. *Trends and Strategic Issues for Librarians in Global Information Society: ICCSR Sponsored Seminar*. Chandigarh, March 18-19, 2008. p 98-104.
 26. SUTRADHAR (B). Design and development of an institutional repository at the Indian Institute of Technology Kharagpur. *Program: Electronic Library and Information Systems*. 40, 3; 2006, p 244-255.
 27. CHERUKODAN (S), SHANTHOS KUMAR (G) and HUMAYOON KABIR (S). Using open source software for digital libraries: a case study of CUSAT. *Electronic Library, The*. 31, 2; 2013, p 217-225.

28. BIRADAR (B S) and BANATEPPANAVAR (K). Steps for Developing Digital Repository using DSpace: An Experience of Kuvempu University, India. *DESIDOC Journal of Library & Information Technology*, 33, 6; 2013, p 474-479.
29. SINGH (S) and PANDITA (N). Building the open access self-archiving repository for the bio-medical sciences at National Informatics Centre. Paper presented at the *National Convention of Medical Library Association of India*. Bangalore, November 07- 09, 2005.
30. KUMAR (S). Establishment of Institutional Mechanism for Building National Repository in Health Sciences. *DESIDOC Journal of Library & Information Technology*, 32, 3; 2012, p 277- 284.
31. JAYAKANTH (F), MINJ (F) and DASTIDAR (P G). Setting up an open access digital repository: A case study. *Annals of Library and Information Studies*, 59,1; 2012, p 16-24.
32. ROY (B K), BISWAS (S C) and MUKHOPADHYAY (P). AgriCat: An One-stop Shop for OAI-based Open Access Agricultural Repositories. *Journal of Agricultural Informatics*, 7, 1; 2016, p 107-118.
33. ROY (B K), BISWAS (S C) and MUKHOPADHYAY (P). Designing metadata harvesting framework for OAI-based LIS repositories: a prototype. *International Journal of Information Science and Management*, 15,1; 2017; p 73-88.
34. ROY (B K), BISWAS (S C) and MUKHOPADHYAY (P). DDC in DSpace: Integration of Multi-lingual Subject Access System in Institutional Digital Repositories. *International Journal of Knowledge Content Development and Technology* [Mss. Submitted].
35. ROY (B K), BISWAS (S C) and MUKHOPADHYAY (P). BURA: An Open Access Multilingual Information Retrieval and Representation System for Indian Higher Education and Research Institutions. *Library Philosophy and Practice* (e-journal). Paper- 1541.