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Creation of Institutional Digital Repository (IDR) for a University Using DSpace

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Abstract:
The primary objective of this paper is to provide practical guidelines for creating up an institutional digital repository using DSpace open source digital library software. In the electronic publishing age, the demand for information has been growing steadily in all spheres of work. At the same time, the concept of access to information at the free of cost in electronic format is gaining momentum. In this direction present paper discussed step by step procedures in creating an institutional digital repository using DSpace including collections. This paper helps in planning to develop an IDR. It also helps the beginners in understanding the steps to be followed for uploading different file formats to create an institutional digital repository (IDR) to maintain a collection with uniformity. DSpace has developed a model that allows users to use the system submit and use content, and administrators can organize and configure the system. To be more useful to different types of users, the software provides a configurable submission and workflow process that can be fit to any organization's information needs. Institutional digital repositories (IDR) are tools to support, disseminate, and showcase the scholarly communications and intellectual life of an institution. A successful deposit requires planning and a defined focus, as well as an attractive name and design. To achieve success, the IDR must serve faculty on faculty's terms; the librarian's role is to collaborate with faculty and ensure that the services of the IDR meet faculty needs.

Keyword: Institutional Digital Repository; Dspace; Repository Creation; Digital Preservation; Open Source; Open Source Software; Digital Library Software; University Digital Archive.

INTRODUCTION

Institutional Digital Repository (IDR) is a managed system for long-term digital objects. Also, Institutional repositories are a type of digital repository that is designated by an institution for the preservation of digital objects produced under its aegis.

A Digital Repository (DR) is a mechanism for managing and storing digital content. Repositories can be subjected based or institutional in their focus.

Putting content into an institutional repository enables staff and institutions to maintain and preserve it, and therefore, derive maximum value from it.

Digital repository consists of a set of interrelated electronic documents, stored in files or a database, usually classified in categories and other criteria, that stores knowledge useful to an institution or an enterprise. Digital repositories stores and manage data, metadata and provide users to access them.

An Institutional Digital Repository (IDR) might also include other digital assets generated by academics, such as datasets, administrative documents, course notes, learning objects, or conference proceedings. The institution sometimes mandates deposit of material in an institutional repository.

THE PURPOSE OF INSTITUTIONAL DIGITAL REPOSITORY

The University of higher education all over India is experiencing the necessity of maintaining their teaching, research, and resources more efficiently and openly. By the creating the research and scientific output easily available, they will support the development of new relationships between the academicians and both national and international research centers. This will facilitate:

- An economic stimulation and institutional development.
- The development of a pedagogical environment rich in information, with a focus on the student.

The institutions of higher education will have to assume that the learning improvement is the key to the success of the Information Society.

DSpace

The DSpace is a joint project of the MIT Libraries and HP Labs. It is a digital asset management system that allows institutions, such as libraries to collect, archive, index, and disseminate the scholarly and intellectual efforts of a community. Written with a combination of technologies by MIT, it is primarily used to capture bibliographic information describing articles, papers, theses, and dissertations. DSpace is adaptable to different community needs. Interoperability between systems is built-in, and it adheres to international standards for metadata format. Being an open source technology platform, DSpace can be customized to extend its capabilities. Some of its characteristics as shown in DSpace documentation areas:

a) It is a service model for open access and digital archiving for permanent access.

b) Provides a platform to frame an Institutional Repository and the collections are searchable and retrievable by the Web.

c) Helps to make available institution-based scholarly material in digital formats. The collections will be open and interoperable.

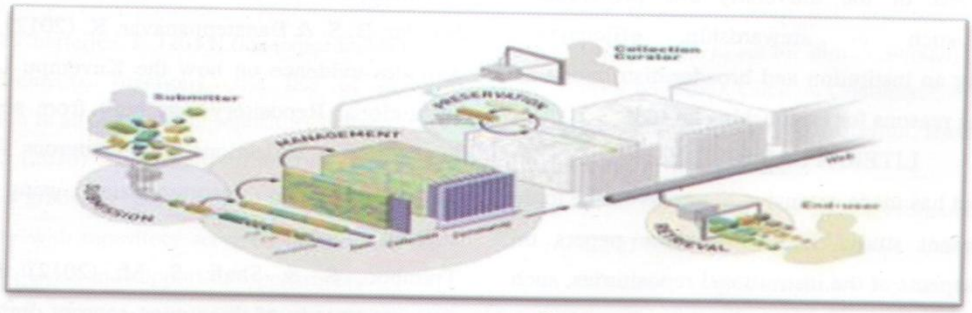


Fig 1: DSpace Digital Repository Model

OBJECTIVES OF THE STUDY

1. The primary paper goal is to create a model repository of digital resources including institutional resources like unpublished /grey literature such as theses, working papers or technical reports without violation of copyright act.;
2. Develop an institutional digital repository for the University, using dspace;
3. Identify services that will be made available via dspace;
4. Formulate general policies and guidelines for submitting digital objects to Dspace;
5. Customize dspace according to the needs of clients and the four identified focus areas; and
6. To provide storage for the electronic resources.

THE SCOPE OF THE STUDY

The model will be developed for Dr. C V Raman University. The Project will be based on Dspace (Digital Library Management Software) Common as suitable software solutions. Other requirements: Ubuntu-16.04: Operating system, Apache Maven, Apache Ant, PostgreSQL (Relational Database), Apache Tomcat, JDK and Dspace 6.

Methodology

The primary procedure will be to install, configure and customize a pilot repository with essential functions.

Download DSpace 6 (Digital library Management software) from Dspace site

↓

Installation of DSpace software on Ubuntu 16.04 version operating system including Open Source solutions compatible with international protocols

↓

Configuration & customization of DSpace software

↓

Creation of an institutional digital repository

LIMITATION

The present study limited to the creation of a digital repository of University only.

The significance of the Study

IDRs can gather and provide access to a wide range of gray literature resources, i.e., material not in a journal article format, such as theses, data sets, presentations, archive documents, and images. Institutional digital repositories (IDRs) are increasingly deployed in academic institutions to manage a variety of digital content including educational, research, and archival materials. The benefits of IDRs have been touted by many authors and include increased knowledge, control over the digital assets of the university and preservation benefits such as stewardship, efficiencies, showcasing an institution and broader distribution as compelling reasons for establishing an IDR.

LITERATURE STUDY

The Project has made extensive literature on the topic under present study. There are some papers on different aspects of the institutional repositories, such as evaluation, case study, implementation, comparison, etc. However, the purpose of the present research article is to focus on the notion of an institutional repository and find development activity only. To bring rigor into argumentation, the present study is exclusively concentrated on institutional repository related research articles and the articles listing, describing and critically analyzing institutional repositories. Following are some of the reviews, which are delineated as follows:

Branschofsky, M.; Lubas, R.; Smith, M. & Williams, S. (2001) As the DSpace digital repository system develops; various metadata needs have emerged to accommodate the different uses being made of the system.

Deka, D. (2006) this paper explores the importance of Institutional Repository (IR) and the role of the Open Source Software (OSS) in building the Institutional Repository of any institution.

Barwick, J. (2007) this paper provides a summary of our experiences of setting up an institutional repository.

Armbruster, C. & Romary, L. (2010) in this regard, four types of publication repository may be distinguished, namely the subject-based repository, research repository, national repository system, and institutional repository.

Jain, P.; Bentley, G. & Oladiran, M. T. (2010) this paper discusses the benefits and obstacles of setting up an IR, and librarians' and authors' roles in the successful management of an IR.

Dhanabalan, A. & Ponnudurai, R. (2012) this paper is the result of an effort to develop a model to create IR (Institutional Repository) by Using Dspace.

Biradar, B. S. & Banateppanavar, K. (2012) the paper provides evidence on how the Kuvempu University Institutional Repository was built from scratch and how different collections with numerous forms and formats can be accommodated using DSpace software.

Tramboo, S. & Shafi, S. M. (2012) this paper presents a study of three open sources digital library management software used to assimilate and disseminate information to a world audience.

Maisal, A. (2012) this paper discusses the creation of an Institutional repository through Dspace.

Madsen, D. L. & Oleen, J. K. (2013) The resultant need to define staff responsibilities and develop resources to manage the workflows has led to the innovations described here, which may prove useful to the greater library community as other IRs mature.

Biradar, B. S. & Banateppanavar, K. (2013) the primary purpose of this paper is to provide practical guidelines for setting up an institutional repository through DSpace open source software.

Lynch (2003) a set of services that a university offers to the members of its community for the management and dissemination of digital materials created by the institutions and its community members. It is most essentially an organizational commitment to the stewardship of these digital materials, including long-

term preservation where appropriate, as well as organization and access or distribution.

Ravikumar, M. N. & Ramanan, T. (2014) this paper scrutinizes those features corresponding to the needs of and challenges faced by the Library of Eastern University, Sri Lanka (EUSL), which is in its initial stage of launching digitized collections representing both its academic works and local publications.

Meyer, D. (2014) this literature review looks at institutional repositories and digital repositories.

Prabhavathi, D. (2015) The Dspace is developed jointly by HP Labs and MIT libraries. This article describes the Dspace system, types of Dspace content and discusses the use of Dspace for an institutional repository.

Das, D. & Chatterjee, P. (2015) this paper focuses on the requirements, functions, and use of digital preservation in an institutional repository context.

Skupa, J. (2016) The Digital Library's range of services is gradually growing and this paper deals specifically with repository services, the process for publishing theses, and support for open access.

Momin, S. S. & Gaonkar, R. C. (2016) this paper presents the results of an effort to develop and design an IR of Anjuman-I-Islam's Kalsekar Technical Campus (AIKTC), New Panvel, and India.

Operating System (Ubuntu 16.04) Installation

Ubuntu is an operating system with Linux kernel based on Debian and distributed as free and open source software. It's one of the most popular operating systems for Desktop and Server.

- Ubuntu ISO image had downloaded from http://releases.ubuntu.com/16.04/
- The ISO image was, burnt to CD/DVD according to file size.

Get started:

1. Insert the Ubuntu CD/DVD or bootable USB in the Computer and boot up as continue press the bootable key (like- f9, f12) according to computer version or company. At first, need to set up the BIOS for boot on the computer;
2. When the show Ubuntu System with Installation Wizard then click the Install icon on the desktop and after choose the language and click "Install Ubuntu" button;
3. If an internet connection, then checks "Downloads update while installing" and "install this third-party software.";
4. Erase all data on your device and install only Ubuntu system on it. This makes only one partition on your disk for Ubuntu 16.04;
5. Follow the wizard to setup location and time zone, keyboard, user account, etc. and finally, start installing;
6. Choose Time zone and press Continue (In the meantime setup will continue in the background, to set for Indian Standard Time click on India). Click on Continue;
7. Now choose the keyboard layout, leave as it is and press Continue;
8. Type name, computer name, username (for login) and password. By default, it will take "Ubuntu" as username and "Ubuntu" as a password. Click on Continue;
9. Once is installed, click "Restart" button;
10. Completed the Ubuntu 16.04 installation.

DSpace 6 installation on Ubuntu 16.04 Version Operating System

Software Requirements for DSpace Installation

1. PostgreSQL Database Software,
2. Apache Ant,
3. Apache Maven,
4. Apache Tomcat Web Server,
5. OpenJDK and
6. DSpace Digital Library Software.

Step-1:

Login as root user:

Setting the network connection by proxy

Open terminal (Open Applications > Accessories > Terminal / press Ctrl+Alt+T)

library@localhost# sudo su (hit enter)

Enter Password

Step-2:

Create Dspace user:

#adduser dspace

#password dspace (enter a password for the new user dspace)

#adduser dspace sudo (for sudo permission)

Step-3:

Login Dspace user:

Setting the network connection by proxy

Open terminal (Open Applications > Accessories > Terminal / press Ctrl+Alt+T)

library@localhost# sudo su (hit enter)

Enter Password

Step-4:

Run the following command:

- Update the Ubuntu :

dspace@dspace-HP-650-Notebook-PC:~$ sudo su

[sudo] password for dspace:

root@dspace-HP-650-Notebook-PC:/home/dspace# apt-get update

Step-5:

Download IDR in .tar.gz file:

- Download IDR in .tar.gz file from Central Library IIT Kharagpur

http://www.library.iitkgp.ernet.in/sites/events/workshop/ndl/ndlWKP/ndl_tut/

- Copy the IDR.tar.gz file in the dspace users home directory, then untar the file.

Step-6:

Installation of PostgreSQL software:

Open the terminal window and give the commands as shown below

dspace@dspace-HP-650-Notebook-PC:~$sudo su

[Sudo] password for dspace:

root@dspace-HP-650-Notebook-PC:/home/dspace# cd IDR

root@dspace-HP-650-Notebook-PC:/home/dspace/IDR#./pgsql64.sh

Please keep on clicking on next button. Don't change the default settings. When the wizard asks for a password, please give dspace123

After the completion of installation, type # exit command in the terminal it should show $ prompt again.

root@dspace-HP-650-Notebook-PC:/home/dspace/IDR#exit

root@dspace-HP-650-Notebook-PC:/home/dspace/IDR$

Now create user and database

Execute PGADMIN III - > double click on pgsql server -> provide the password as dspace123

Right mouse click on Roles -> create new role -> role name: dspace and pass word as dspace123

Right mouse click on databases -> create new database -> database name: dspace and owner as dspace

Enable pgcrypto Extension

Right click on mouse on dspace under the database -> select new created database "dspace" right click on it -> Select New Object -> Select New extension then select "pgcrypto" from Name dropdown.

After the completion of installation, type # exit command in the terminal it should show $ prompt again.

Step-7:

Now set the environmental variables for JAVA_HOME, ANT_HOME, and M2_HOME as well as set the proxy address. Execute the commands shown below. Go back to the terminal and type

root@dspace-HP-650-Notebook-PC:/home/dspace/IDR$./env64.sh

root@dspace-HP-650-Notebook-PC:/home/dspace/IDR$./copy64.sh

root@dspace-HP-650-Notebook-PC:/home/dspace/IDR$source env64.sh

root@dspace-HP-650-Notebook-PC:/home/dspace/IDR$./test.sh

Step-8:

Installation of DSpace Software. Execute the commands in terminal as shown below

root@dspace-HP-650-Notebook-

PC:/home/dspace/IDR$./install.sh

It should show the following Output on the terminal screen

Build Success

...

Build Success

...

Create Administrator

Email:

First Name:

Last Name:

Password:

This password is not visible and re-types when asked next again

Tomcat Started

root@dspace-HP-650-Notebook-PC:/home/dspace/IDR$exit

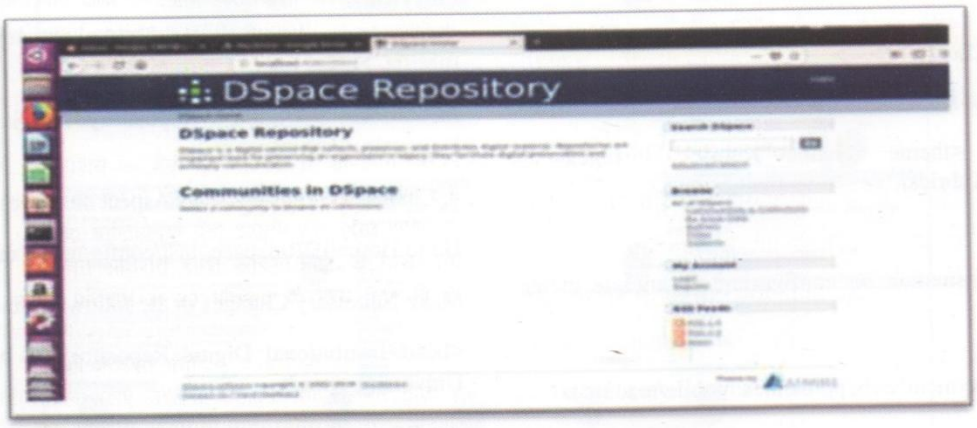
Step-9:

Dspace has two interfaces (xmlui and jspui)

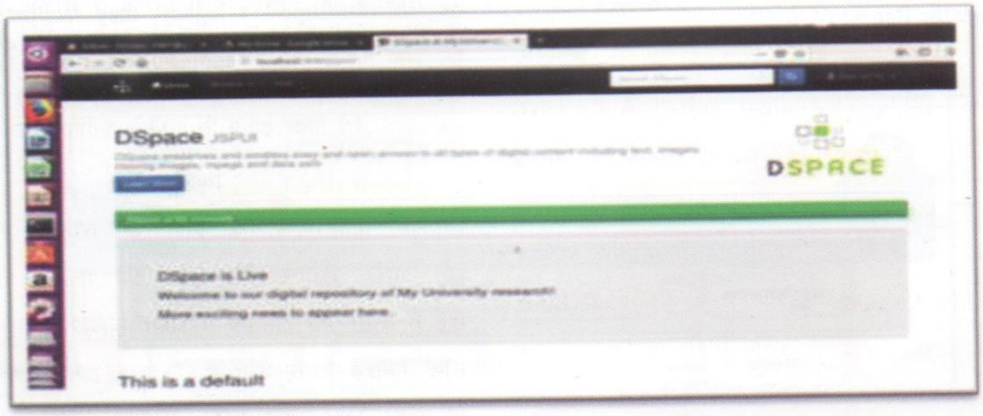
To see the Interface, open the browser and type the following in address bar.

http://localhost:8080/xmlui or http://localhost:8080/jspui

XMLUI Interface: http://localhost:8080/xmlui Dspace Interface



JSPUI Interface: http://localhost:8080/jspui Dspace Interface



Configurations and Customization of Dspace (Digital Library Software)

User Interface Modification of Xmlui Interface

1. Theme Change

Go to Home/IDR/dspace_inst/conf/xmlui.xconf

Find tag Comment/Uncomment Tags to select Theme

<themes>

<!-- Example configuration -->

<!-- <theme name="Test Theme 1" handle="123456789/1" path="theme1/"/> -->

<!-- <theme name="Test Theme 2" regex="community-list" path="theme2/"/> -->

<!-- Mirage theme, @mire contributed theme, default since DSpace 3.0 -->

<theme name="Atmire Mirage Theme" regex=".*" path="Mirage/" />

<!-- Reference theme, the default Manakin XMLUI layout up to DSpace 1.8 -->

<!-- <theme name="Default Reference Theme" regex=".*" path="Reference/" /> -->

<!-- Classic theme, inspired by the JSP UI -->

<!-- <theme name="Classic" regex=".*" path="Classic/" /> -->

<!-- The Kubrick theme -->

<!-- <theme name="Kubrick" regex=".*" path="Kubrick/" /> -->

<!--

For information on configuring the mobile theme, see:

dspace-xmlui/src/main/webapp/themes/mobile/readme.txt

-->

</themes>

2. Change the Banner of header

Go to Home/IDR/dspace_inst/webapps/xmlui/themes/Mirage/lib/css/style.css

#ds-header-wrapper {

background: url ('../../image/banner1.png') no repeat center;

color: bule;

min-width: 750px;

min-height: 50px;

3. Change the Header message

Go to Home /IDR /dspace_ inst/ webapps/ xmlui/i18n/messages.xml

Make Necessary Changes in the following line:

<message key="xmlui.dri2xhtml.structural.head-subtitle">

Institutional Digital Repository
Name of University</message>

4. Change the Dspace News Aspect messages

Go to Home/IDR/dspace_inst/config/news-xmlui.xml

Make Necessary Changes in the following line/s

<head>Institutional Digital Repository of Name of University</head>

DSpace is a digital service that collects, preserves, and distributes digital material. Repositories are important tools for preserving an organization' s legacy; they facilitate digital preservation and scholarly communication.

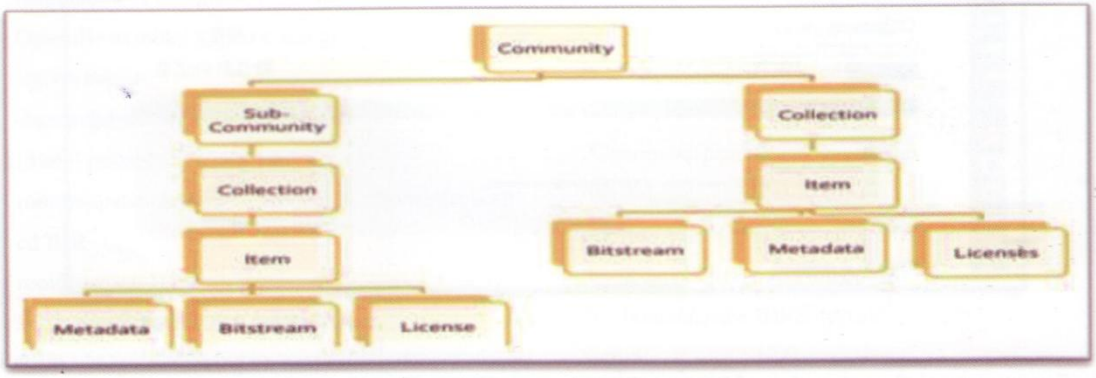
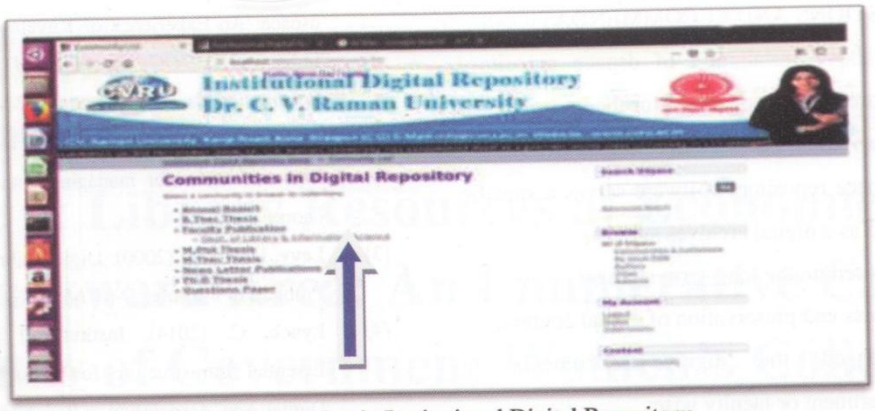


Figure2: Data model of community and collection

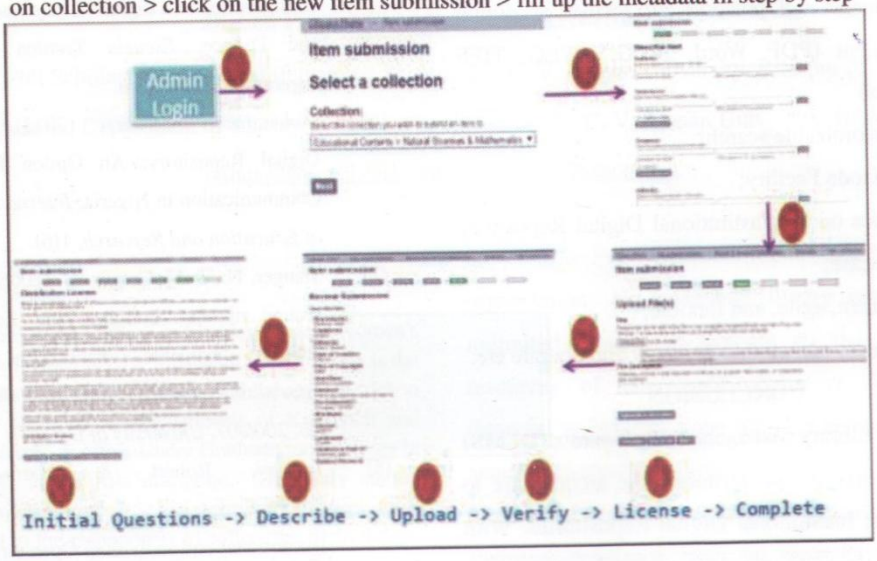
Creation of Collection

Click on top-level community > Click on Create Collection > Type on collection name > Click on Create > Click on Return



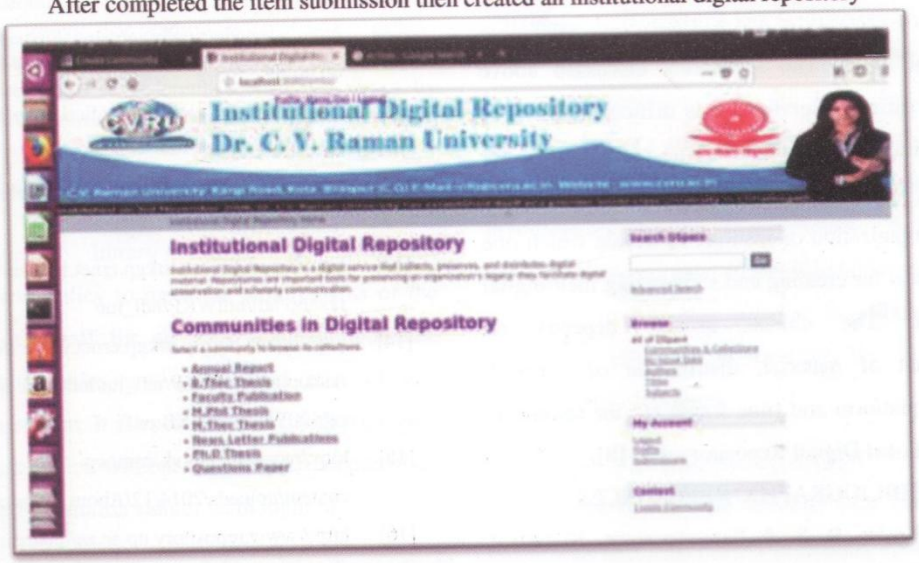
Item Submission in Institutional Digital Repository

Login the institutional digital repository by admin user id and password > click on top-level community > click on collection > click on the new item submission > fill up the metadata in step by step



Created the Institutional Digital Repository

After completed the item submission then created an institutional digital repository



SUGGESTIONS AND RECOMMENDATIONS

From the above installation of dspace repository some measures can be suggested for the improvement of library services:

- DSpace repository software serves a specific need as a digital archives system;
- Focused on the long-term storage;
- Access and preservation of digital content;
- Arranged the digitize documents in department or faculty wise;
- Completely customizable to fit user needs;
- Manage and preserve all format of digital content (PDF, Word, JPEG, MPEG, TIFF files)
- Customizable search;
- Unicode Facility;
- Focus on the Institutional Digital Repository use case;
- Be lean, agile, and flexible;
- Be easy and simple to install and operate etc.

CONCLUSION

The Digital Library Management Software's (DLMS) present an easy to use, customizable architecture to create online Institutional Digital Repositories. With these institutions/organizations can disseminate their research work, manuscripts, or any other digital media for preservations and world over dissemination of digital items. The software's discussed above provides different services. It is difficult to propose one specific DLMS system as the most suitable for all cases. The study can be used as a reference guide by any organization or institute to decide which one will be ideal for creating and showcasing their digital collection. The choice usually depends on type/format of material, distribution of material, software platform and time frame etc for setting up an Institutional Digital Repository. [7], [8].

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