It's a truism in technological development that no silver lining comes without its cloud.

Bruce Sterling (Opening Statement to the House Subcommittee on Telecommunications and Finance, Washington D. C.)
Structure

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6.0 Introduction

This chapter deals with designing and development of a service model of the software framework BURA (Burdwan University Research Archive) and also describes different core components of the service model. This chapter describes various steps involved in administering DSpace, like creating and maintaining Communities, Sub-communities and Collections, user registration, creation of E-People; authorizing E-People to submit to the Collections; creating and maintaining E-Groups, designing workflow, withdraw and removal of items etc. The chapter describes browsing and searching of different Communities and Collections with different search syntax. This chapter also shows process of metadata harvesting from different OAI-PMH compatible repositories via protocols like OAI/PMH and user can search many IDRs at a time from a single-window search interface. Another feature of this chapter is to provide an alternative way for users to access different interactive communication tools like Blog (in order to keep them up to date with the latest information posted on BURA blog site) and getting news for updated contents in BURA through RSS feed. The chapter also describes development of multi-lingual features and allow users searching, browsing and retrieving of different regional languages like Bengali/or Hindi languages. This chapter also shows the process of browsing and searching of specific subject category using Indic-script based subject access system to enhance subject categories.

6.1 Administration of BURA

This section describes various steps involved in administering DSpace, such as creating, modifying and removing and maintaining Communities, Sub-communities and Collections, user registration, creation of E-People; authorizing E-People to submit to the Collections; creating and maintaining E-Groups, designing workflow and selection of E-person(s) or Groups for workflow, withdraw and removal of items etc. The tasks begin with creating Communities and Collections and some steps in BURA are essential and some are optional. These steps have been enumerated here.

A. Essential Steps:

- Create Community and Sub-community
- Create Collection
- Create Collection authorizations
- Create Users who will act as reviewers, metadata editors, approvers
Administrator can also perform the following optional steps for fine tuning of the BURA –

**B. Optional Steps:**

- Creating Sub-communities
- Creation of Groups
- Modifying Dublin Core Registry (Discouraged)
- Adding additional file formats to Bitstream Format Registry
- Modifying or Deleting Digital Items
- Handling News

Administrator can log into BURA by entering following URL in the browser `http://<domain/IP>:8080/dspace/dspace-admin`. In this research study, it can be done here by `http://localhost:8080/dspace/dspace-admin` and administrative operations can be performed using the following interface (Fig. 6.1).

![Fig. 6.1: Log in as Administrator](image)

### 6.1.1. Creation of Top Level Community

In DSpace, repository is organized in terms of Community(s) and Collection(s) and optionally one can create Sub-community(s) under each Community and also any number of levels of Sub-communities under each Sub-community. It can be anything and there is no hard and fast rule in designing Community(s) and Sub-community(s). One can use ‘Dewey Decimal Classification’ (DDC) system and any other classification system depending on policy of the repository can be used to organize repository resources. The Community(s) and Collection(s) need not be subject-wise. In other words, Community(s) and Sub-community(s) can be arranged hierarchically.
The following are the steps that a repository administrator should follow in creating Community and Sub-community in BURA:

- A name to the community (mandatory);
- A short description of the community (optional);
- An introductory text (in html format) about the community (optional);
- A copyright note (optional);
- Text (in html) to be appeared on the right column of the Digital repository page (optional);
- A logo to appear on the community page (optional); and
- A list of e-people, who can modify the logo (optional).

Three top level Communities (Fig. 6.1.1) have been created for the BURA software framework under which different academic departments (here Sub-communities) have been created (vide section 4.2.1.2 of chapter 4).

The moment repository administrator clicks on ‘Communities/Collections’ button (Fig. 6.1.1.1) at the top left corner of the window, this option displays a window (Fig. 6.1.1.2) from where new Community can be created. Another window (Fig. 6.1.1.3) is displayed and finally ‘Create’ button can be clicked to have the Community.
Administration Tools

Please select an operation from the navigation bar on the left.

Fig. 6.1.1.1: Community creation (step 1)

Communities and Collections

Shown below is a list of communities and the collections and sub-communities within them. Click on a name to view that community or collection home page.

- Faculty of Arts and Humanities
  - Department of Bengali
    - Dissertations and Theses (Dept. of Bengali)
    - Extension Services and Departmental Products (Dept. of Bengali)
    - Faculty Publications (Dept. of Bengali)
    - Learning Objects (Dept. of Bengali)
    - Projects and Reports (Dept. of Bengali)
    - Question Papers (Dept. of Bengali)
  - Department of Business Administration
    - Dissertations and Theses (Dept. of Business Administration)
    - Extension Services and Departmental Products (Dept. of Business Administration)
    - Faculty Publications (Dept. of Business Administration)
    - Learning Objects (Dept. of Business Administration)
    - Projects and Reports (Dept. of Business Administration)
    - Question Papers (Dept. of Business Administration)
  - Department of Business Administration (Human Resource)

Fig. 6.1.1.2: Community creation (step 2)
6.1.2. Deletion of Top Level Community

In the same way like creating Community in section 6.1.1, it can be deleted by clicking on ‘Edit’ button from Admin Tools box (Fig. 6.1.2).

The moment administrator clicks on ‘Delete this Community’ button (Fig. 6.1.2.1) displays another window (Fig. 6.1.2.2) and finally clicking of ‘Delete’ button automatically delete it.
6.1.3. Creation of Sub-community

BURA administrator can create Sub-community (i.e. academic departments) under any Community (vide section 4.2.1.2 of chapter 4). After selecting appropriate Community (i.e. Faculty of Arts and Humanities), the moment administrator clicks on the ‘Create Sub-community’ button (Fig. 6.1.3), the window (Fig. 6.1.3.1) allows
creating it (here Department of Library and Information Science) by clicking of ‘create’ button.

Fig. 6.1.3: Creation of Sub-community (step 1)

Fig. 6.1.3.1: Creation of Sub-community (step 2)
6.1.4. Deletion of Sub-community

Sub-community can also be deleted if authority so desires and it can be done by clicking on “Edit” button (Fig. 6.1.2) from Admin Tools box. Interface (Fig. 6.1.4) given below allows administrator to delete it. It can be used to edit the Sub-community name. Finally clicking of ‘Delete’ button (Fig. 6.1.4.1) automatically delete it.

Fig. 6.1.4: Delete Sub-community

Fig. 6.1.4.1: Sub-community Deleted
6.1.5. Creation of Collections

Creating Collections for any repository system is essential and it can be created only after having a Community or Sub-community (if any) in the system. Community maintains an unlimited number of Collections in the system. It (Community) can have a combination of Sub-communities and Collections. Again under each Sub-community there can be sub-sub-communities and Collections. However, Collection can not be sub-divided into sub-collections. It is the Collections that hold digital items (also referred as digital documents or digital objects). BURA has the following six (6) types of Collections under each academic department (as suggested in section 4.2.1.3 of chapter 4).

- **Dissertations and Theses (Collection Type - 1)**
- **Extension Services and Departmental Products (Collection Type -2)**
- **Faculty Publications (Collection Type - 3)**
- **Learning Objects (Collection Type - 4)**
- **Projects and Reports (Collection Type - 5)**
- **Question Papers (Collection Type - 6)**

The following figure (6.1.5) shows Collections type under the Sub-community ‘Department of Library and Information Science’ which has been created under the top level Community ‘Faculty of Arts and Humanities’.

![Collections Types](Fig. 6.1.5: Collections Types of BURA)
The process of creating Collection is shown here through fifteen screen snapshots (Fig. 6.1.5.1 through Fig. 6.1.5.15). Here ‘Faculty Publications’ has been created as a Collection under the Sub-community ‘Library and Information Science’. It (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. 6.1.5.1).

![Fig. 6.1.5.1: Community selection for creating Collection](image)

The next logical step is selection of workflow (vide section 4.2.1.12 of chapter 4) for the Collection and interface (Fig. 6.1.5.2) given below allows to design workflow as proposed in the repository policy.

![Fig. 6.1.5.2: Workflow selection](image)
The moment administrator clicks on the button ‘Next’ (Fig. 6.1.5.2), the system displays the window (Fig. 6.1.5.3) for entering required data in appropriate boxes.

The next logical step is selection of submitter(s) for the Collection and this vital task has been demonstrated here through three screen snapshots (Fig. 6.1.5.4 through Fig. 6.1.5.6). The window (Fig. 6.1.5.4) displays all the E-person(s) in the system and Collection administrator can add/or remove submitter(s) from the list and is shown through two screen snapshots (Fig. 6.1.5.5 & Fig. 6.1.5.6).
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Fig. 6.1.5.4: Selection of E-person for Submission

Fig. 6.1.5.5: List of selected Submitters
This submitter(s) list can also be edited and modified by clicking on ‘Edit Submitters’ button (Fig. 6.1.5.7) and is shown here through two screen snapshots (Fig. 6.1.5.8 & Fig. 6.1.5.9).
Fig. 6.1.5.8: Display of Submitter’s List

Fig. 6.1.5.9: Submitter’s List Modified
In section 4.2.1.12 of chapter 4, this research work recommends three steps in submission workflows having separate E-person(s) for performing specified tasks in different stages of submission of item to the Collection. In each workflow step, the programme generates a small window from where system administrator can pick up appropriate E-person(s) from the list for each workflow step and is shown through six different screen snapshots (Fig. 6.1.5.10 to Fig. 6.1.5.15). The button ‘Select E-people’ (Fig. 6.1.5.10) can be clicked to add E-person(s) for the workflow – I.

![Submission Workflow Accept/Reject Step](image1)

Fig. 6.1.5.10: E-person(s) selection for Workflow 1

A click on ‘Remove Selected’ button (Fig. 6.1.5.11) removes selected E-person(s) from the workflow – I.

![Submission Workflow Accept/Reject Step](image2)

Fig. 6.1.5.11: Removal of E-person for Workflow 1
The button ‘Select E-people’ (Fig. 6.1.5.12) can be clicked to add E-person(s) for the workflow – II.

A click on ‘Remove Selected’ button (Fig. 6.1.5.13) removes selected E-person(s) from the workflow – II.
The button ‘Select E-people’ (Fig. 6.1.5.14) can be clicked to add E-person(s) for the workflow – III.

Fig. 6.1.5.14: E-person(s) selection for Workflow 3

A click on ‘Remove Selected’ button (Fig. 6.1.5.15) removes selected E-person(s) from the workflow – III.

Fig. 6.1.5.15: Removal of E-person for Workflow 3
6.1.6. Deletion of Collection

Repository manager can delete a Collection by clicking on ‘Edit’ button (Fig. 6.1.5.7) at the right corner of the window. A click on ‘Delete this Collection’ button (Fig. 6.1.6) displays another window (Fig. 6.1.6.1) and finally button ‘Delete’ can be clicked to delete it.

Fig. 6.1.6: Deletion of Collection

Fig. 6.1.6.1: Collection deleted
6.1.7. Items

Items are one of the core concepts in DSpace. An item a representation of the files and metadata bought together to make an atomic unit. Each Collection in DSpace Digital Repository is populated with items, also called digital objects or digital documents. An ‘item’ is made up by the following things:

- Metadata;
- Bitstreams; and
- Bundles (e.g. Original/License/Text).

An item may have one or more bitstreams. In other words, an item can be a bundle of bitstreams (e.g. files). Submitter can upload more than one file for single a document. For example, generally thesis consists of many chapters and each chapter is a PDF file, so at the time of uploading all the PDF files together to be considered as one digital item. One can also submit a set of html files and mention which should be considered as the primary file, so that when the digital item is opened by any end-user, the primary file would be displayed first. Later the user can navigate through hyperlinks in the html files. In these cases, each file is considered as a bitstream, and all the files together constitute a digital item.

6.1.8. User Registration in BURA

Registration of users is mandatory in BURA. Account registration section includes login ID, password, password hint and answer to password (in case password is forgotten). Personal information section includes fields like name, surname, phone etc. After successful registration a user can access and use every facilities of BURA including submission of resources. The process of user registration in BURA includes two other associated facilities – modification of user profile and help authorized user to retrieve forgotten password or to set a new password, if required. Modification of user profile facility can be utilized to change user related data including login and password through resubmission of modified member login form. The forgotten password link allows users to retrieve the forgotten password or to set a new password.
A. Becoming a member of BURA

In section 4.2.1.3 of chapter 4, this research work recommends that the person associated with the University of Burdwan can be the member of the System (BURA) and can avail all facilities of the system. The process of user registration is demonstrated here through eight screen snapshots (Fig. 6.1.8 through Fig. 6.1.8.7). It begins with clicking of ‘New user? Click here to register’ button (Fig. 6.1.8) and putting E-mail ID in appropriate box (Fig. 6.1.8.1).

![Fig. 6.1.8: Login as a New User](image)

The system generates a small window (Fig. 6.1.8.2) displaying the message that E-mail has been sent successfully to the user.
In the next logical step, the mail sent by the system administrator has to be opened (http://localhost/webmail/) through E-mail ID and password (Fig. 6.8.1.3).

The message showing ‘DSpace Account Registration’ (Fig. 6.8.1.4) can be clicked to have the link (Fig. 6.8.1.5).
The registration form (Fig. 6.1.8.6) can be displayed by clicking on this link (URL) and finally clicking of ‘Complete Registration’ button thereon indicates user registration process is completed (Fig. 6.1.8.7).
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**Fig. 6.1.8.6: User Registration Form**

**Registration Information**

Please enter the following information. The fields marked with an * are required.

- **First name**: Kakoli
- **Last name**: Roy
- **Contact telephone**:
- **Language**: English

Please choose a password and enter it into the box below, and confirm it by typing it again into the second box. It should be at least six characters long.

- **Password**: ********
- **Again to Confirm**: ********

**Complete Registration**

---

**Fig. 6.1.8.7: User Registration Completed**

**Registration Complete**

Thank you, Kakoli,

You're now registered to use the DSpace system. You can subscribe to collections to receive e-mail updates about new items.

**Return to DSpace Home**
6.1.9. Password Management

This part is only for authorized user of the system and BURA allow authorized user(s) changing logging password. The following steps are to be followed if the password entered by authorized user is wrong or password has been forgotten or E-mail entered by user is found wrong. The process of changing password is shown here through five screen snapshots (Fig. 6.1.9 through Fig. 6.1.9.4). The moment administrator clicks on ‘Have you forgotten your password?’ button (Fig. 6.1.8), another window (Fig. 6.1.9) will be displayed and allows user entering E-mail which had been used at the time of registration.

![Fig. 6.1.9: E-mail for Forgotten Password](image)

Corresponding E-mail containing message about changing password will be sent to the user. A click on ‘I Forgot My Password’ option (Fig. 6.1.9) displays the subsequent window (Fig. 6.1.9.1) that indicates new password E-mail has been to the user.

![Fig. 6.1.9.1: New Password E-mail](image)
A click on this message ‘Change Password Request’ (Fig. 6.1.9.2) allows user to set the new password.

The moment user clicks on ‘Set New Password’ button (Fig. 6.1.9.3), password will automatically be changed (Fig. 6.1.9.4).
6.1.10. Mail Management

Once an item is submitted to a Collection in BURA sends an E-mail notification to the concerned E-people(s) (e.g. submitter, reviewer, metadata editor). All the E-persons playing different roles in submission process (vide section 4.2.112 of chapter 4) will be informed by mail to perform their individual tasks to complete the process. For example, kakoli is performing two roles – (i) **Submitter**; and (ii) **Metadata editor** in the Collection (Here Faculty Publication - Dept. of Lib. & Inf. Sc.). Two separate mails (Fig. 6.1.10 & Fig. 6.1.10.1) will be sent to the concerned E-person (kakoli) of which one mail is for ‘Submitter’ and another mail is for ‘Metadata editor’ to that particular Collection.
6.11. Editing Profile

BURA has a provision to update or edit profile information of authorized users and it can be done by clicking ‘Edit Profile’ button at the left hand side of the window (Fig. 6.1.1) and is shown through two screen snapshots (Fig. 6.1.11 & Fig. 6.11.1). The form (Fig. 6.1.11.1) can be displayed after clicking on ‘Log In’ button (Fig. 6.11). Once updating is completed, button ‘Update Profile’ (Fig. 6.11.1) can be clicked to save the data.
6.1.12. E-Person(s) Management

DSpace calls users ‘E-people’. Normally, anyone can become a member of BURA using ‘My DSpace’ in the left hand side menu of the first screen of the window. However, it is desirable to have some initial members, who can take the responsibility of reviewing and approving of contents. Though it is not mandatory to have members initially, to configure a repository for the first time, it is convenient to create some members or groups. When Community and Collection are created, the process can be completed by assigning who or which group is authorized to submit or review or modify metadata (vide section 4.2.1.12 of chapter 4). The system (BURA) holds the following information about each E-person -

- E-mail address;
- Phone number;
- First and last names;
- A password (encrypted), if appropriate; and
- A list of collections for which the e-person wishes to be notified of new items.

The process of managing E-person(s) is shown here through five screen snapshots (Fig. 6.1.12 through Fig. 6.1.12.4). The moment ‘E-people’ button (Fig. 6.1.1.1) is clicked, the system displays the window (Fig. 6.1.12) having three options and system administrator can select any one of the three operations by clicking on appropriate
This ‘Add E-Person’ button (option 1) can be clicked here to add a new E-person to the system and finally ‘Save’ button (Fig. 6.1.12.1) can be clicked to save it. This window can also be used to edit information about the E-person.
The programme generates a small window (Fig. 6.1.12.2) showing all E-person(s) in the system and repository administrator after selecting E-person(s) from the list can delete E-person(s) by clicking of ‘Delete’ button (Fig. 6.1.12.3).

And finally it will be prompted to confirm the deletion of selected E-person(s) (Fig. 6.1.12.4).
6.1.13. Registering E-person as an Administrator

The system allows E-person(s) to be registered as administrator to perform various operations in BURA. E-person(s) having in the list can be added as administrator and new group for the system can be created by clicking of ‘Groups’ button (Fig. 6.1.13) in the left hand corner of the window.
This administrator(s) list can be modified by clicking on ‘Edit’ button (Fig. 6.1.13.1) and is shown here in two screen snapshots (Fig. 6.1.13.2 & Fig. 6.1.13.3).

Fig. 6.1.13.1: Administrator Group

Fig. 6.1.13.2: Administrator Group selected

In section 4.2.1.12 of chapter 4, this study recommends workflow policy of BURA and interface (Fig. 6.1.14) given below allows administrator to select E-person(s) or Groups for different workflow steps designed for the Collection. Another window (Fig. 6.1.14.1) shows the lay out of submission workflow with framework sheet.
6.1.15. Item Mapping

Item mapping facilities has been providing in Dspace (version 1.2 onward). Items can appear in more than one Collection especially when subjects are interdisciplinary in nature and covers more than one discipline (i.e. Biochemistry, Biotechnology). The tool that 'maps' items to Collections other than the one that owns it is the "Item Mapper". Repository manager can pick up appropriate Collection to be mapped an item from another Collection. Repository manager can view search box (Fig. 6.1.15) by clicking on ‘Item Mapper’ button (Fig. 6.1.5.7) and the window (Fig. 6.1.15.1) displays the matched item.
6.1.16. Submission Process in BURA

BURA offers an easy-to-use Web-based process for submitting digital works one by one to an established Collection. BURA supports not only distributed access of resources from anywhere at anytime but also extends scope to submit resources over the Web. BURA allows remote submission of resources through authorized users. Provision of remote submission of resources by authorized users truly characterizes the distributed nature of IDR system. The process of remote submission in BURA is password authenticated to ensure credibility of information providers. Once logged in, user can click the "Submissions" link in the ‘My DSpace’ section and will find:

- a list of his/her in-progress submissions - from this list he/she can resume the submission process where he/she left off, or he/she can remove the submission and cancel the work;
- a list of the submissions which he/she is supervising or collaborating on;
- a list of submissions that are awaiting his/her action (if he/she have a collection workflow role); and
- a link to a list of works that he/she has submitted and that has already been accepted into the repository.

Submitting a work to the BURA is a multi-step process. The process of submission includes 7 (seven) different steps starting from selection of Collection, filling out information about the work on a form and uploading the file(s) comprising the digital work etc. At any point in the submission process submitter can stop and save the work for a later date by clicking on the ‘Cancel/Save’ button at the bottom of that page. The data already entered by the submitter will be stored until submitter returns to the submission, and submitter will be reminded through ‘My DSpace’ page that an item has been in submission in process. If some how accidentally exits from the
submissions process, submitter can always resume submission from ‘My DSpace’ page.

A. Submission Progress Bar

The ‘Submission Progress Bar’ (Fig. 6.1.16) is a set of grey buttons at the top of the ‘Submit page’. As submitter move through the process, these ovals will be activated. Once it is started, submitter can also use these buttons to move back and forth within the submission process by clicking on it. Data will remain intact even moving back and forth. This ‘chain’ appears at the top of all the succeeding screens. The node in ‘red’ indicates the current screen of the seven (7) screens.

![Submission Progress Bar Diagram](image)

Fig. 6.1.16: Submission Progress Bar

B. Start a New Submission

This section gives step-by-step instructions of the submission process of BURA. The whole process of submission is shown here through fifteen screen snapshots (Fig. 6.1.16.1 through Fig. 6.1.16.15). It can be done both by going to – (a) ‘Collection page’ (options given is ‘Faculty Publications - Dept. of Lib. & Inf. Sc.’) and clicking on the ‘Submit to This Collection’ button (Fig. 6.1.16.1) or by logging/or going to the (b) ‘My DSpace’ (Fig. 6.1.16.2) and clicking on the ‘Start a New Submission’ button (Fig. 6.1.16.3).

![Submission Collection Page](image)

Fig. 6.1.16.1: Submission Collection Page
Fig. 6.1.16.2: Submission: Log in ID & Password

Fig. 6.1.16.3: New Submission Interface

The interface (Fig. 6.1.16.4) displays all the Collections submitter is authorized to submit and is supported by drop down menu lists from where submitter can select desired Collection.
The first deposit page (Fig. 6.1.16.5) displays three options and if none of these questions apply, submitter can click on ‘Next’ button to go to the next succeeding screens (Fig. 6.1.16.6).

Fig. 6.1.16.4: Selection of Collection

Fig. 6.1.16.5: Item Description
This window (Fig. 6.1.16.6) allows submitter to enter metadata in required fields one-by-one. Some of these fields are mandatory and some are repeatable and ‘Next’ button can be clicked once it is done.

The next subsequent windows (Fig. 6.1.16.7A & Fig. 6.1.16.7B) display additional metadata fields like Abstract, Subject Keywords fields and Description etc. In section 4.2.1.2 of chapter 4, this research work recommends use of vocabulary control device for BURA. BURA software framework applied DDC 22nd edition (up to 3rd summary in English and Bengali languages). It can also be used in Bengali (vide section 5.4 of chapter 5). Submitter can view all top level subjects in English as well as in Bengali by clicking on appropriate ‘Subject Categories’. Submitter can navigate throughout
the subject category(ies) and can select any of the top subjects in English as well as in Bengali along with its sub-divisions. 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. In this way integrated control subject device can be utilized to achieve consistency and desired information at the time of submission and searching.

Fig. 6.1.16.7A: Submission Form: Level – 2 (selection of subjects categories - English)

Fig. 6.1.16.7B: Submission Form: Level – 2 (selection of subjects categories - Bengali)
When the data entry work is completed, the next logical step is uploading file (Fig. 6.1.16.8).

Fig. 6.1.16.8: File Uploading

This window (Fig. 6.1.16.9) provides two options and submitter can pick up appropriate action (if required).

Fig. 6.1.16.9: File Verification
A click on the ‘Click here if this is the wrong format’ button (Fig. 6.1.16.10) allows submitter changing format of the submitted file.

![Correction of Wrong File Format](image)

**Fig. 6.1.16.10: Correction of Wrong File Format**

The uploaded data (e.g. submitted file) can be checked and changed further here by clicking of ‘Show Checksums’ button (Fig. 6.1.16.11). Checksum is a process to verify that the submitted data has transmitted properly. The objective is to check that the file submitted to the server is exactly the same file uploaded.

![Checksums Uploaded File](image)

**Fig. 6.1.16.11: Checksums Uploaded File**
This window (Fig. 6.1.16.12) gives a chance to verify the integrity of file over time as well as when it (file) was uploaded.

Fig. 6.1.16.12: File Checked

Repository manager can view all metadata fields along with the file(s) and appropriate button on the right ‘Correct one of these’ in front of the section (Fig. 6.1.16.13) can be clicked to correct or edit information about the submitted item(s).
Use red ovals to move backwards and forward.

Fig. 6.1.16.13: Submission Verification
After verification of file(s), another legal matter is granting license and finally button ‘I grant the License’ (Fig. 6.1.16.14) can be clicked to complete the submission process (Fig. 6.1.16.15).

Fig. 6.1.16.14: Granting License

Fig. 6.1.16.15: Submission Completed
6.1.17. Taking Workflow Task

After submission is completed, an item enters into the BURA workflow and the relevant user/group member (e.g. E-people) involved in workflow processes will be notified through E-mail that there is a task to be taken. This section displays the task(s) in the pool waiting to be completed and concerned E-person(s) can accept the task by clicking on ‘Take Task’ button (Fig. 6.1.17).

![Tasks in the Pool](image)

Fig. 6.1.17: Tasks in the Pool (step 1)

The next window (Fig. 6.1.17.1) displays an overview of the item in details.

![Preview Task](image)

Fig. 6.1.17.1: Tasks in the Pool (step 2)
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The system generates another window (Fig. 6.1.17.2) having five (5) options on the right in front of the section and concerned E-person(s) can pick up appropriate button to perform the following operations. Metadata editor can edit metadata of the items by clicking on ‘Edit Metadata’ button. The item can also be rejected and returned to the pool of tasks by pressing of ‘Reject’ button. Finally ‘Approve’ button can be clicked to have the item into BURA.

The item finally gets a handle and concerned person(s) will be notified about the inclusion of the item to the repository (Fig. 6.1.17.3).
6.1.18 Workspace Item

When the submission process is not completed (e.g. unfinished submission), the submitted item will not go to the BURA and will be displayed in the Workspace section. The process can be completed here and is shown through six screen snapshots (Fig. 6.1.18 through Fig. 6.1.18.5). The button ‘Open’ (Fig. 6.1.18) can be clicked and the subsequent window (Fig. 6.1.18.1) having three options will be displayed and any one of them can be picked up.

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**Fig. 6.1.18: Workspace Item**

**Fig. 6.1.18.1: Description of Workspace Item**
In anytime, edition, deletion, withdrawn and removal of item is possible and can be done through the librarian interface (Fig. 6.1.18.2). This window displays the items in details and necessary changes in metadata fields along with the file can be made here by clicking on the corresponding button on the right ‘Remove’ in front of the section. Item can also be viewed in the same fashion as it would be displayed when it is finally submitted to the BURA.

![Edit Item](image)

**Fig. 6.1.18.2: Workspace Item: Edition**
Finally ‘Show full item record’ button (Fig. 6.1.18.3) can be clicked to show the metadata records of the submitted item (Fig. 6.1.18.4).

Fig. 6.1.18.3: View Workspace Item

Fig. 6.1.18.4: Short displays of full Metadata record of Workspace Item
The item can also be removed (vide section 4.2.1.16 & 4.2.1.16.1 of chapter 4) from the archive after clicking of ‘Remove the item’ button (Fig. 6.1.18.5).

6.1.19. Withdrawal item

Repository must facilitate processes that supports withdrawn of submitted item from the system. In section 4.2.1.16 & 4.2.1.16.1 of chapter 4, this study recommends that submitted item(s) may be withdrawn from the archive on special circumstances. The moment administrator clicks on ‘Withdraw’ button (Fig. 6.1.18.2), the corresponding window (Fig. 6.1.19) automatically withdraws the item from the repository after clicking on ‘Withdraw’ button.
6.1.20. Move Item

In any repository system, there should have a mechanism by which item can be moved from one Collection to another. BURA allows item to be moved from one Collection to another if it is entered wrongly to a Collection and can be done by pressing of ‘Move Item’ button (Fig. 6.1.18.2). The window (Fig. 6.1.20) is supported by drop-down menu option and displays all the Collections available in the system. Repository manager can pick up appropriate Collection where item can be moved.

A click on ‘Move’ button finally displays another window (Fig. 6.1.20.1) and button ‘Remove the Item’ can be clicked to move the item to the desired location.
6.2 Services of BURA

Only a few repositories throughout the world have implemented service model and have others in the pipeline. Evidence suggests that it is repository services that will determine the uptake and success of repositories within the academic and research community. A close study of the most prominent OARs registered in ROAR and OpenDOAR databases along with some other best practice guidelines as proposed by SPARC, CARL reveals that following core services should form an integral part of a typical OARs. There are already many examples of repository services in existence. BURA offers some basic functionality e.g. basic and advanced search facilities, different browsing options, downloading etc. The following are the core services BURA offers to its users discussed below with screen snapshots.

6.2.1 Browsing of Resources

Browsing allows user to go through a list of works in a variety of specified orders. The browsing panel, as designed in BURA, contains all the Communities, Sub-communities and networked resources placed under them. The browsing panel of user interface is primarily meant for linking globally available and locally useful OAR resources with software framework of BURA. Here user can browse documents by

- Community and Collection;
- By Title;
- By Subject;
- By Author;
- By Date, and
- By Departments.

BURA allows user to browse a list of works in a variety of specified orders mentioned below. Any item or record that is processed and stored in IDR Cluster of the software framework can be linked with browsing panel of BURA user interface. The following screen snapshots (Fig. 6.2.1 through Fig. 6.2.1.6) display and show browsing documents through different search syntaxes.

A. Browse by Community and Collection

This option takes user through the Communities arranged in alphabetical order and allows them to see the Sub-communities and Collections within each Community. And user can search documents through all Communities/Collections in the system (Fig. 6.2.1). Additionally, the browse can be limited to items within a particular Community or Collection (Fig. 6.2.1.1).
Fig. 6.2.1: Browse by Communities

Fig. 6.2.1.1: Browse by Collections
B. **Browse by Title**

This option allows users to search documents through the title of the documents. All the titles of items are arranged in alphabetical order in BURA (Fig. 6.2.1.2).

![Fig. 6.2.1.2: Browse by Title](image)

C. **Browse by Author**

This option allows users to move through an alphabetical list of all authors of items in BURA (Fig. 6.2.1.3).

![Fig. 6.2.1.3: Browse by Author](image)
D. **Browse by Date**

This option allows user to move through a list of all items in BURA in reverse chronological order by publication date (if previously published or date of creation). But it can be changed by clicking on the ‘Show Older First’ link on the top right of the page (Fig. 6.2.1.4).

![Fig. 6.2.1.4: Browse by Date](image)

E. **Browse by Subject**

This option allows user to move through subject indices/tags assigned to works arranged in alphabetical order (Fig. 6.2.1.5).

![Fig. 6.2.1.5: Browse by Subject](image)
F. Browse by Department

This option allows user to move through an alphabetical list of academic departments and research units on campus assigned to works in the repository (Fig. 6.2.1.6).

### Sub-communities within this community

- Department of Bengali
- Department of Business Administration
- Department of Business Administration (Human Resource)
- Department of Commerce
- Department of Economics
- Department of Education
- Department of English
- Department of Foreign Language
- Department of Hindi
- Department of History
- Department of Law

Fig. 6.2.1.6: Browse by Departments

6.2.2 Searching in BURA

Search is an essential component of discovery in BURA provides a search interface and supports as many search features as possible. Search facility of BURA User Interface is provided through IDR Cluster of the software framework. It produces a simple but powerful search interface along with a few additional utilities like facility to display recent submissions. The end user can browse, search and access the collections using the hierarchies and also the alphabetic bar menu. BURA supports sophisticated searching with the help of search operators (Boolean, positional and relational operators) both within the local repository and across the repositories of multiple institutions. BURA offers by default the following search features: (1) Search all DSpace, (2) Bounded Search within a specified Community’s Collection, (3) Simple search and (4) Advanced search. Even users can restrict search to a specific subject category (vide section 6.5).
A. Searching Community/Collection

BURA also allows users to search documents through all Communities/Collections in the system (Fig. 6.2.2. & Fig. 6.2.2.1). Users can also limit search to a specific Community or Collection, navigate to that Community or Collection and use the search bar on that page (Fig. 6.2.2.2 & Fig. 6.2.2.3).

![Fig. 6.2.2: Search in all DSpace](image1)

![Fig. 6.2.2.1: Search results in all DSpace](image2)
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Fig. 6.2.2.2: Search a specific Community

Search Results

Search: Faculty of Arts and Humanities
for repository

Results/Page [10] | Sort items by Relevance | In order Descending | Authors/record | All | Update

Item hits:

<table>
<thead>
<tr>
<th>Issue Date</th>
<th>Title</th>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-Mar-2013</td>
<td>DESIGNING INSTITUTIONAL DIGITAL REPOSITORY FOR THE UNIVERSITY OF BURODWAN: A FLOSS BASED PROTOTYPE</td>
<td>Roy, Bijan Kumar</td>
</tr>
<tr>
<td>4-Mar-2013</td>
<td>Pathfinder Research on Web-based Repositories: FINAL REPORT</td>
<td>Ware, Mark</td>
</tr>
<tr>
<td>4-Mar-2013</td>
<td>CASLIN 2009: Institutional Online Repositories and Open Access</td>
<td>University of West Bohemia</td>
</tr>
<tr>
<td>3-Mar-2013</td>
<td>An Analytical Study of Institutional Digital Repositories in India</td>
<td>Roy, Bijan Kumar; Biswas, Subal Chandra; Mukhopadhyay, Parthasarathi</td>
</tr>
<tr>
<td>3-Mar-2013</td>
<td>Open Access Repositories in Asia: From SAARC to Asian Tigers</td>
<td>Roy, Bijan Kumar; Biswas, Subal Chandra; Mukhopadhyay, Parthasarathi</td>
</tr>
</tbody>
</table>

Fig. 6.2.2.3: Search a specific Collection

Search Results

Search: Faculty Publications (Dept. of Lib. & Inf. Sc.)
for open access

Results/Page [10] | Sort items by Relevance | In order Descending | Authors/record | All | Update

Item hits:

<table>
<thead>
<tr>
<th>Issue Date</th>
<th>Title</th>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Apr-2013</td>
<td>Open Access to scholarly information in India: Trends and Developments</td>
<td>Roy, B. K; Biswas, S. C; Mukhopadhyay, P</td>
</tr>
<tr>
<td>3-Mar-2013</td>
<td>Open Access to scholarly information in India: Trends and Developments</td>
<td>Roy, Bijan Kumar; Biswas, Subal Chandra; Mukhopadhyay, Parthasarathi</td>
</tr>
<tr>
<td>3-Mar-2013</td>
<td>Open Access Repositories in Asia: From SAARC to Asian Tigers</td>
<td>Roy, Bijan Kumar; Biswas, Subal Chandra; Mukhopadhyay, Parthasarathi</td>
</tr>
<tr>
<td>3-Mar-2013</td>
<td>Designing single-window search service for electronic theses and dissertations through metadata harvesting</td>
<td>Sarkar, Prasenjit; Mukhopadhyay, Parthasarathi</td>
</tr>
<tr>
<td>3-Mar-2013</td>
<td>An Analytical Study of Institutional Digital Repositories in India</td>
<td>Roy, Bijan Kumar; Biswas, Subal Chandra; Mukhopadhyay, Parthasarathi</td>
</tr>
</tbody>
</table>
B. Advanced Search

To navigate to the advanced search page, user can click on ‘Advanced Search’ link (Fig. 6.2.2) at the top left corner of the BURA software framework. This interface (Fig. 6.2.2.4) allows user to specify the search fields and user can combine these searches with the Boolean operators "AND", "OR" or "NOT". The window is supported by drop down menu list from where user can pick up required value and can restrict search to a Community by clicking on the arrow to the right of the top box. If users like to search all of the BURA, user can leave that box in the default position. User can select the field to be searched in the left hand column and on the other hand search word or phrase can be used in the right hand column. User can select the Boolean operator to combine searches by clicking on the arrow to the right of the "AND" box. The window (Fig. 6.2.2.5) display the results against a search query matched (e.g. author:bijan or author:biswas or author:mukhopadhyay).

![Advanced Search Syntax](image)

![Display of Results (Advanced Search)](image)
C. Exact Term/Phrase Search

The search term can be a word or a phrase. One can use a search word, e.g. “open access” or a phrase “open access repository”. For phrase search, the phrase should be enclosed with double quotes.

D. Exact Word Match Search

Put a plus (+) sign before a word if it MUST appear in the search result. For instance, in the following search the word "archive" is optional, but the word "digital" must be in the result (e.g. +digital archive).
E. **Eliminate Works with unwanted Words**

Put a minus (-) sign before a word if it should not appear in the search results. Alternatively, you can use NOT. This can limit your search to eliminate unwanted hits. For instance, in the searches e.g. *digital – archive* means *digital NOT archive*.

![Image](image.png)

**Fig. 6.2.2.8: Eliminate Works with unwanted Words**

F. **Fielded Search**

The Fielded Search query enables searching of specific field provided in the query. One can search for a term in a particular field or any field by typing the field name followed by a colon "::" and then the term looking for.

*e.g.: author:bijan or title:repository*

![Image](image.png)

**Fig. 6.2.2.9: Fielded Search by Author**
G. Wild cards

The symbol ‘*’ is used for multiple characters matching, as in “arch*” matches with archive, archival, archiving etc. It is (*) used as an asterisk after a word stem to get all hits having words starting with that root.

The symbol ‘?’ is used for a single character, as in ‘op?n’ that matches words like ‘open’, ‘open access’ etc.
H. Fuzzy Search

One of the popular fuzzy search algorithms is Levenshtein distance or Edit Distance, algorithm named after the Russian scientist Vladimir Levenshtein, who devised the algorithm in 1965. The Levenshtein distance algorithm has been used in:

- Spell checking
- Speech recognition
- DNA analysis
- Plagiarism detection

To do a fuzzy search, use the tilde symbol, "~", at the end of a single-word term. To search for a term similar in spelling to "subal" use the fuzzy search: subol~

This search will find terms like subal. For example: author:subol~ can match subal.
I. Proximity Search

Proximity search is used in a query to retrieve documents that have two words or phrases in proximity i.e. that they appear near to each other. To do a proximity search, use the tilde symbol, "~", at the end of a phrase. For example, “library science”~3. It will retrieve records where the words ‘library’ and ‘science’ are within the three words distance.

Fig. 6.2.2.14: Proximity Search

J. Range search

Range Queries allow one to match documents whose field(s) values are between the lower and upper bound specified by the Range Query. Range Queries can be inclusive or exclusive of the upper and lower bounds. Sorting is done lexicographically. If the search query is- author:[rao TO rath]. Then the system retrieves documents authored by names that fall between ‘rao’ and ‘rath’ (Fig. 6.2.2.15).

Fig. 6.2.2.15: Range Search by Author
Whereas, the query is - author:{agrawal TO bali} excludes 'agrawal' and 'bali' (Fig. 6.2.2.16).

### K. Boolean Search

Boolean ‘AND’, ‘OR’, ‘NOT’ are used for Boolean combinations. Boolean operators must be CAPITALIZED. Boolean operators allow terms to be combined through logic operators.

- ‘OR’ is the default conjunction operator. One can use ‘||’ instead of ‘OR’. It is used to enlarge searches to find works containing any of the words or phrases surrounding this operator. To search for documents that contain either the word "repository" or "archive" use the query: "repository" OR "archive". It will retrieve all works that contain either the words "repository" or "archive".

---

**Fig. 6.2.2.16: Range Search by Author**

**Fig. 6.2.2.17: Boolean Search by ‘OR’**
• Either ‘AND’ or ‘&&’ can be used for Boolean ‘AND’. It will retrieve documents where both the terms ("repository" and "archive") exist anywhere in the text of a single document. To search for documents that contain the word "repository" and "archive" use the query: "repository" AND "archive".

Fig. 6.2.2.18: Boolean Search by ‘AND’

• Either ‘NOT’ or ‘!’ can be used for Boolean ‘NOT’. It is used to exclude works containing the word following this operator, e.g. in this case it will retrieve documents that do not contain the term “archive”. The NOT operator cannot be used with just one term. To search for documents that contain the word "repository" not "archive" use the query: "repository" NOT "archive".

Fig. 6.2.2.19: Boolean Search by ‘NOT’
L. Searching Item by Handle

Handle is considered crucial for any repository system that citations to archived material, whether found in printed articles or online, remain valid for long periods. DSpace uses Handles primarily as a means of assigning globally unique identifiers to objects. It is a name for a resource that will remain the same regardless of where the resource is located. Presently, Handles are assigned to Communities, Collections, and Items. But bundles and bitstreams are not assigned Handles. BURA supports searching all Communities (Fig. 6.2.2.22), Sub-communities (Fig. 6.2.2.23), Collections (Fig. 6.2.2.24) and Items (digital documents) using handle assigned to it. User can also restrict search within a particular Community or Collections and the process is shown here through five screen snapshots (Fig. 6.2.2.20 through Fig. 6.2.2.24).

Fig. 6.2.2.20: Searching Item using Handle

Fig. 6.2.2.21: Display of Result using Handle (Item)
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Fig. 6.2.2.22: Searching Community using Handle

Fig. 6.2.2.23: Searching Sub-community using Handle

Fig. 6.2.2.24: Searching Collection using Handle
6.3. **Multilingual Features**

Repository system must be Unicode compliant to support multilingual features and must support searching and browsing of different regional/local languages. Multiple languages should be supported in the user interface, in the metadata fields and in the digital contents. BURA has developed an Indic-script based Unicode-compliant multilingual user interface (Fig. 6.3) that supports not only browsing, searching and retrieving of various regional languages (here Bengali) languages but also allows to perform different administrative operations such as creating, modifying, removing and maintaining Communities, Sub-communities and Collections, user registration, password management, creating and maintaining E-Peoples and E-Groups, withdraw and removal of items etc. The Bengali script based browsing and searching of resources in BURA (on Bengali Collections) is demonstrated here through different screen snapshots.

![Fig. 6.3: Bengali Script based User Interface of BURA](image-url)
A. Browsing of Resources

Any Community information record that is processed and store in IDR Cluster of the software framework can be linked with browsing panel of BURA user interface. User can pick up any search syntax (e.g. Community, Collection, author, title, subject, date etc.) given in the panel to browsing resources and is demonstrated here through different screen snapshots (Fig. 6.3.1 through Fig. 6.3.6).

Fig. 6.3.1: Browse by Community (Bengali Collections)

Fig. 6.3.2: Browse by Collection (Bengali Collections)
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![Browse by Date (Bengali Collections)](image1)

![Browse by Author (Bengali Collections)](image2)

Fig. 6.3.3: Browse by Date (Bengali Collections)

Fig. 6.3.4: Browse by Author (Bengali Collections)
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Fig. 6.3.5: Browse by Title (Bengali Collections)

Fig. 6.3.6: Browse by Subject (Bengali Collections)
B. Searching of Resources

The following screen snapshots (Fig. 6.3.7 through Fig. 6.3.10) demonstrate Bengali language based search capability of the interface generated by BURA. Results retrieved against a search query can be displayed below in four screen snapshots.

![Fig. 6.3.7: Display of Search Results in BURA (Bengali Collections)](image)

![Fig. 6.3.8: Short Display of Record details (Bengali Collections)](image)
Fig. 6.3.9: Display of Search Results in Bengali

Fig. 6.3.10: Short Display of Record details in Bengali
Community, Collection or Item in BURA can be searched by using Handle or internal ID assigned to it and is shown in two screen snapshots (Fig. 6.3.11 & Fig. 6.3.12).

C. Advanced Searching

Advanced search mechanism can be accessed from User Interface (Fig. 6.3) by simply clicking the corresponding link ‘Advanced Search’ (here অন্যতম অনুসন্ধান). This window (Fig. 6.3.13) is supported by drop down menu list and provides facility of Boolean operators supported field level searching (e.g. by subject, title, abstracts, keywords, language etc.). In advanced search, user can restrict search by selecting
appropriate fields using drop-down menu and Boolean operators "AND" (সংযোগ), "OR" (অথবা) or "NOT" (নয়) can be used to restrict search to a specific field.

Fig. 6.3.13: Bengali Script based Advanced Search Interface

The process of advanced searching using different search syntax is shown here through four different screen snapshots (Fig. 6.3.14 through Fig. 6.3.17).

Fig. 6.3.14: Bengali Script based Advanced Search
Fig. 6.3.15: Display of Advanced Search Results in Bengali

Fig. 6.3.16: Display of Search Results in Bengali (Advanced Search)
D. User Registration Process in BURA

Registration can be done by clicking of ‘Registration’ (here নিউভুকন) button at the right hand side of the window (Fig. 6.3). The process of user registration is shown here through three screen snapshots (Fig. 6.3.18 through Fig. 6.3.22).

The system sends a message having a link (Fig. 6.3.19) to the user and it has to be opened to have the registration form.
If the E-mail supplied by the user is already used, system sends a caution message to the user (Fig. 6.3.20).

This registration form (Fig. 6.3.21) can be displayed by clicking on the link containing a URL and user related data that is collected by this registration process are stored in database.
E. E-Person and Group Management

Any time, addition, deletion of E-person or Group is possible and is shown here through six screen snapshots (Fig. 6.3.23 through Fig. 6.3.28). The programme displays the form (Fig. 6.3.24) needs to be filled up by new E-person and finally shows the results (Fig. 6.3.25). In the same way new group can be created and is shown through three screen snapshots (Fig. 6.3.26 through Fig. 6.3.28).
Fig. 6.3.24: E-person Form

Fig. 6.3.25: Display of Results of New E-person
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Fig. 6.3.26: Group Management

Fig. 6.3.27: Addition of New Group

Fig. 6.3.28: Display of Results of New Group
F. Profile Editing

In any time user profile can be edited and modified by clicking on button ‘Edit Profile’ (Fig. 6.3.35) (here পরিচায়ক). A click on this button displays the form (Fig. 6.3.29) needs to be updated by concerned E-person and the next subsequent window (Fig. 6.3.30) displays the message of updating profile.

![Profile Update Form](image)

Fig. 6.3.29: Profile Update Form

![Profile Updated](image)

Fig. 6.3.30: Profile Updated
G. Password Management

Authorized users can only use the system and authentication is done by requesting user name (e.g. ID) and password. The forgotten password link allows user to retrieve the forgotten password or to set a new password. The process of changing password is shown here through four screen snapshots (Fig. 6.3.31 through Fig. 6.3.34). The system first displays a small window (Fig. 6.3.31) for entering user ID or login name which user had used at the time of registration.

If user login name is correct the programme sends a mail (Fig. 6.3.32) to the user and generates another window (Fig. 6.3.33) again by asking the answer to password hint and user can set a new password.
Fig. 6.3.33: Forgotten password utility (step 3)

Fig. 6.3.34: Forgotten password utility (step 4)
H. Community and Sub-community Management

In any time addition, deletion and modification of Community and Sub-community (here সম্পদায় এবং অধীনসম্পদ) is always possible and can be done through librarian interface. The process of creation and deletion of Community and Sub-community is shown here through three screen snapshots (Fig. 6.3.35 through Fig. 6.3.37).

Fig. 6.3.35: Creation of Community
Fig. 6.3.36: Deletion of Community

Fig. 6.3.37: Creation of Sub-community
I. **Collection Management**

In the same way, Collection (here সংগ্রহ) can be created under any Community. Any time deletion and modification of Collection is possible and is shown in two screen snapshots (Fig. 6.3.38 & Fig. 6.3.39).

![Fig. 6.3.38: Creation of Collection](image1)

![Fig. 6.3.39: Deletion of Collection](image2)
The next logical step is to perform various administrative operations (e.g. E-person selection, workflow management etc.) at the Collection level and can be done by clicking of appropriate button at the right hand side of each section (Fig. 6.3.40).
This window (Fig. 6.3.41) is supported by drop down menu lists from where E-person/Group can be chosen for different workflow and is shown in two screen snapshots (Fig. 6.3.42 & Fig. 6.3.43).

Fig. 6.3.41: List of E-persons or Group

Fig. 6.3.42: Selection of New E-person
J. Submission Process of BURA

BURA allows distributed submission of resources from any workstation at anytime. The system allows remote submission of resources through creation of membership. The submission process in BURA has been discussed in details in section 6.1.16 of chapter 6.Submitter can start new submission by clicking of ‘Submission’ (দাখল করুন). The submission process is demonstrated here through ten screen snapshots (Fig. 6.3.44 through Fig. 6.3.53). The programme generates a small window (Fig. 6.3.44) which is supported by drop down menu lists allows submitter selecting appropriate Collection. The node in ‘green’ indicates the current screen of the seven (7) screens.
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Fig. 6.3.44: Submission Process Step 1

Fig. 6.3.45: Submission Process Step 2
The windows (Fig. 6.3.46 & Fig. 6.3.47) are displayed and submitter can enter required metadata in specified fields one-by-one.

Fig. 6.3.46: Submission Process Step 3
The next logical step is uploading file(s) and can be done through ‘Browse’ button (Fig. 6.3.48). Again, the system displays all the metadata fields along with the file(s) and submitter can check and verify it clicking on appropriate button of the particular section (Fig. 6.3.49).
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Fig. 6.3.48: Submission Process Step 5

Fig. 6.3.49: Submission Process Step 6
To make the submission process complete, granting license is mandatory and it can be done clicking on ‘I grant the License’ button (here আমি লাইসেন্সটি ছাড়ি দিচ্ছি) (Fig. 6.3.50).

Fig. 6.3.50: Submission Process Step 7

Fig. 6.3.51: Submission Process Step 8
Once the submission is over, item can be sent to the concerned E-person(s) for final approval for inclusion of the item into BURA and is shown here in two screen snapshots (Fig. 6.3.52 & Fig. 6.3.53).

Fig. 6.3.52: Submission Process Step 9
The window (Fig. 6.3.52) displays four options and concerned E-person can pick up anything by clicking on it. And finally button ‘অনুমানিত তালিকাভুক্ত বিষয়’ can be clicked to have the item to the archive.

**Fig. 6.3.53: Submission Process Step 10**

### K. Item Management

BURA software framework allows addition, deletion, withdrawal and removal of submitted items (তালিকাভুক্ত বিষয়) and all the operations can be done clicking on appropriate button of the subsequent window (Fig. 6.3.54). A number of Bitstrem
can be added and side by side existing Bitstreams already in the system can also be deleted and is shown in three screen snapshots (Fig. 6.3.55 through Fig. 6.3.57).
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Fig. 6.3.56: New Bitstreams Added

Fig. 6.3.57: Bitstreams Deleted
The window (Fig. 6.3.58) is displayed and submitted item can be edited and new metadata field can be incorporated by clicking on the appropriate button and finally displays the item in details (Fig. 6.3.59).

Fig. 6.3.58: Metadata Addition
If an item is wrongly entered to a Collection, it can be moved to the desired destination (Collection). The system displays a window (Fig. 6.3.60) supported by drop down menu list from where repository manager can select appropriate Collection where item is to be moved.
Bitstrem and Bundles policy can be changed and system manager can add, edit or restated existing policy clicking on the appropriate button on the right side of the each section (Fig. 6.3.61).

In any time, item can be withdrawn, removed and reinstated and is shown in three screen snapshots (Fig. 6.3.62 through Fig. 6.3.64).
**Fig. 6.3.62: Withdrawal of Item**

<table>
<thead>
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<th>Value</th>
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<tr>
<td>dc.contributor.advisor</td>
<td></td>
</tr>
<tr>
<td>dc.contributor.author</td>
<td>বিভাগীয়, বিভাগের সহকারী</td>
</tr>
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Fig. 6.3.63: Removal of Item

Fig. 6.3.64: Item Reinstated
L. Administrative Policy Management

BURA software framework allows managing policies related to Community, Collection or Item. The new policy can be added, edited or modified by selecting desired field. The entire process of managing administrative policy is shown here through five screen snapshots (Fig. 6.3.65 though Fig. 6.3.69).

![Administrative Policy Management Screen Shot]

- **Faculty of Arts and Humanities**
  - **Department of Bengali**
    - Dissertations and Theses (Dept. of Bengali)
    - Extension Services and Departmental Products (Dept. of Bengali)
    - Faculty Publications (Dept. of Bengali)
    - Learning Objects (Dept. of Bengali)
    - Projects and Reports (Dept. of Bengali)
    - Question Papers (Dept. of Bengali)
  - **Department of Business Administration**
    - Dissertations and Theses (Dept. of Business Administration)
    - Extension Services and Departmental Products (Dept. of Business Administration)
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Fig. 6.3.66: Administrative Policy 2

Fig. 6.3.67: Administrative Policy 3
Chapter 6: Development of Services

**Fig. 6.3.68: Administrative Policy 4**

**Fig. 6.3.69: Administrative Policy 5**

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<td>1</td>
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<td></td>
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<td>2</td>
<td>Tulu Roy</td>
<td>tulu@localhost</td>
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6.4. Federated Search

Repository should have provision or support for the creation of metadata at the point of contribution or submission, and assurance that the metadata will be available to search engines (within the repository and externally) and/or harvesters. Here in BURA, metadata can be created by two ways – (i) by submitter at the time of submission or (ii) by librarian. Repository must have mechanism of harvesting metadata along with full text from different OAI-PMH compliant repositories worldwide. BURA allows metadata export from OAI-PMH compatible repositories via protocols like OAI/PMH (version 2.0). This software framework allows user browsing and searching a specific repository or all repositories harvested. It may eventually make it much simpler to replicate and redeposit contents in multiple repositories. The process of metadata harvesting from selected OAI-PMH compliant repositories is shown here through nine different screen snapshots (Fig. 6.4 through Fig. 6.4.8).

The system allows browsing repository(ies) and is demonstrated through three screen snapshots (Fig. 6.4 through Fig. 6.4.2).
Fig. 6.4.1: Display of Results (Browsing)

Fig. 6.4.2: Short Display of Record details (Browsing)
BURA allows users searching all repositories and is shown through three screen snapshots (Fig. 6.4.3 through Fig. 6.4.5).

Fig. 6.4.3: Searching all Repositories in BURA for Metadata Harvesting

Fig. 6.4.4: Display of Search Results (Searching)
In the same way users can also restrict search within a repository and is demonstrated through three screen snapshots (Fig. 6.4.6 through Fig. 6.4.8).

**Fig. 6.4.6: Searching specific Repository (Metadata Harvesting)**
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Search Results

REVISE SEARCH

Open Access... from the librarian's point of view
Subirats-Coll, Imma; Heinisdóttir-Zodi, Iva; Paveil, Damir
2013-05-16
VIEW RECORD | VIEW ORIGINAL

How OSI is helping to make open access happen
Friend, Frederick J.
2013-05-16
VIEW RECORD | VIEW ORIGINAL

The case for open access publishing, with special reference to open access journals and...
Moller, Allison
2013-05-16
VIEW RECORD | VIEW ORIGINAL

Open Access von A bis Z
Stieg, Kerstin; Pavlovic, Karto
2013-05-16
VIEW RECORD | VIEW ORIGINAL

Looking at the forthcoming Berlin 5 Open Access Conference, Padova 19-21 September 2007
Tallianer, Laura
2013-05-16
VIEW RECORD | VIEW ORIGINAL

Sociological implications of scientific publishing: Open access, science, society,...
Herz, Ulrich
2010-02-01
VIEW RECORD | VIEW ORIGINAL

Open Access for the Medical Librarian
Morrison, Heather; Waller, Andrew
2013-05-16
VIEW RECORD | VIEW ORIGINAL

Open Access - Ein Wundermittel? Wissenschaft, Gesellschaft, Demokratie, Digital Divide

Fig. 6.4.7: Display of Search Results from specific Repository (Metadata Harvesting)

Record Details

The case for open access publishing, with special reference to open access journals and their prospects in South Africa

E- LIS repository

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<th>VALUE</th>
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</tr>
<tr>
<td>Creator</td>
<td>Moller, Allison</td>
</tr>
<tr>
<td>Subject</td>
<td>ED. Intellectual property: author's rights, ownership, copyright, copyleft.</td>
</tr>
<tr>
<td>Description</td>
<td>Open access publishing is an initiative that aims to provide universal, unrestricted free access to full-text scholarly materials via the Internet. This presents a radically different approach to the dissemination of research articles that has traditionally been controlled by the publishing enterprise that regulates access by means of subscriptions and licence fees levied on users, predominantly academic libraries. In presenting the case for open access publishing, the thesis explores the contemporary research environment, changing modes of knowledge production, the problems associated with the existing academic journal system, and the subsequent growth of the open access movement as an intervention to refrains scientific communication. It highlights the ways in which open access better answers the requirements of researchers, funders, governments, and society more broadly. Free access to publicly funded scientific research is more democratic and is necessary for knowledge dissemination and production in a knowledge economy, particularly for developing countries such as South Africa. Attention is drawn to the ways that open access interacts with the ethical norms guiding the practice of research, with the idea of information as a public good, and with other parallel initiatives that resist the enclosure of knowledge through excessive copyright legislation. The study also closely interrogates the economic viability of open access journals, and how the 'author pays' model represents a reasonable approach, but by no means the only one available to publishers considering the transition to open access. Sections are also devoted to examining the impact potential of open access articles and the ways in which open access journals can achieve greater impact.</td>
</tr>
</tbody>
</table>

Fig. 6.4.8: Short Display of Record details from specific Repository (Metadata Harvesting)
6.5 Subject Authority Management

DDC (22\textsuperscript{nd} edition - up to 3\textsuperscript{rd} summary) has been incorporated in BURA software framework to enhance subject categories (as proposed in Chapter 4 and as demonstrated in section 5.4 of chapter 5) that allows users browsing and searching specific subject category. It helps user finding a subject category which may not be organized under Communities and Sub-communities of BURA software framework or has not been categorized in the proposed model.

It (DDC) can be displayed by simply clicking on the link in the left side of the navigation panel and user can navigate throughout the list and can select appropriate subject category(ies) (Fig. 6.5). This window displays the main divisions and sub-divisions of DDC in English.

![Subject Search Interface in DDC (English)](image)

Fig. 6.5: Subject Search Interface in DDC (English)
The subsequent window (Fig. 6.5.1) displays all subject categories of DDC in Bengali. Each broad subject has a hierarchical listing of subject categories/sub-categories and is grouped under those subjects. These keywords are organized in a subject tree (or subject taxonomy) which appears during searching as well as indexing process. Top level terms are displayed and user can navigate any of the top term by simply clicking on it. The plus sign (+) indicates that category has sub-categories and/or links to resources under it.

![Subject Search Interface in DDC (Bengali)](image)
The process of searching of specific subject category in Bengali is shown in two screen snapshots (Fig. 6.5.2 & Fig. 6.2.3). For example, four different subjects (রাunjib; অর্থনীতি; সামাজিক সমসযা; পিরেসবা ইত্যাদি) under ‘Social Science’ have been displayed along with its sub-divisions.

![Subject Searching in DDC (Example 1)](image1)

![Subject Searching in DDC (Example 2)](image2)
Another novelty of this research is that this software framework allows users to filter documents against a standard subject division/subdivision (taken from DDC). After putting a term in search box (here জল and আেমিরকা), it displays all the subject categories having matched with the term. It shows all the links/or fields related with that particular term and is shown through different screen snapshots (Fig. 6.5.4. & Fig. 6.5.5).

![Fig. 6.5.4: Filtering of Subject Searching (Example 1)]
Fig. 6.5.5: Filtering of Subject Searching (Example 2)
The filtering process is also available at the time of indexing. Indexer can put desired term(s) directly in appropriate box at the time of searching as well as may pick up category(ies) from integrated vocabulary control device (here DDC). It should be pointed out that indexer may opt for any number of subject categories or subject divisions for populating subject access field in a given metadata schema (here DC.Subject). The moment indexer clicks against a search query, it will expand the subject categories and the system displays all the sub-divisions of the term matched (Fig. 6.5.6 through Fig. 6.5.9).

![Fig. 6.5.6: Indexing of Subject Term: Category 1 (Example 1)](image1)

![Fig. 6.5.7: Indexing of Subject Term: Category 1 (Example 2)](image2)
Fig. 6.5.8: Indexing of Subject Term: Category 2 (Example 1)

Fig. 6.5.9: Indexing of Subject Term: Category 2 (Example 2)
6.6 Utility Services

BURA User Interface provides access to various Web tools like Blogs, RSS to support real-time interactive communication facilities for BURA members. These software tools are also termed generically as ‘social networking software’.

A RSS

RSS alternatively defined as “Really Simple Syndication” or “Rich Site Summary”. Feeds (e.g. RSS/Atom feeds) are used in customized alert services to send information on new articles of interest in the repository. A Feed is a function of special software that allows Feed readers to access a site automatically looking for new contents and then post updates about that new content to another site. This provides a way for users to keep up with the latest information posted on different blogging sites and other Web services that are compatible to Feed. It keeps track of new items of interest in their favourite feed readers. Like other repositories, BURA has an RSS feed (Fig. 6.2.1) that can be incorporated into readers and other Web applications, boosting accessibility to the works. Access to RSS feed from BURA user interface is shown here through two screen snapshots (Fig. 6.6 & Fig. 6.6.1).

Fig. 6.6: Searching Latest Submission using RSS Feed
B Blog

Another community interaction provision in BURA software framework is blogging. Blog is an abbreviated version of weblog. Web logs or Blogs software are now quite popular for two reasons – a Blog software can automatically report inclusion or submission of new information from a group of selected Website and provides opportunities to submit full length articles, news, views etc. on various topic and subjects and access archival information in an interactive ways. The blogging facility in BURA software framework is demonstrated here through three screen snapshots (Fig. 6.6.2 through Fig. 6.6.4). The first link opens registration window (Fig. 6.6.2) for new users and the second link (Fig. 6.6.3) is meant to access blog services for already registered users. Users can pick up any category to display posting of message, comments or full length article under it and to post new message, comment, article or response against any posted material (Fig. 6.6.4).
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Fig. 6.6.2: New User Registration to Blog of BURA

Fig. 6.6.3: Categories of Services of Blog of BURA
6.7 Miscellaneous Administrative Services

BURA has been actively involved in the development of add-ons for that platform and offers several other services to the users. These services are equally important from administrator point of view in order to keep the system active and are considered essential for smooth running of BURA. Among these, the most noteworthy are:

A Preservation and Migration Services

Preservation implies some additional specialized work on repository contents. It must provide the expertise for long-term storage and curation of digital data. BURA is committed to preserving the bit stream (the binary form of the data). BURA provides long-term access to submitted works, as well as associated descriptive and administrative metadata, by employing a strategy combining the following:

- Secure backup
- Storage media refreshment
- File format migration (including possible migration to preferred formats during submission)

B Embargo Management

Embargo Management is an important part of access control policy and BURA morally supports access restriction of contents by imposing embargo period (as
prescribed in section 4.2.1.6 of chapter 4) on it. In some cases, users may want to keep their contents limited-access for a set time period, so that they can get a patent, obey a publishing contract, or prepare for a coordinated announcement. It’s much easier if depositors can just say “keep this limited access until this data, and then open it up,” and the repository service handles matters from there.

C Access Control and Rights Management

The system (BURA) should support for users and groups, authentication and authorization methods and must impose level of restriction for access and update collections, digital objects and contents. BURA allows three types of resource access: full text access, privileged access, and restricted access (as proposed in section 4.2.1.6 of chapter 4). Access control policies can be enabled by the repository authorization module that allows access at the item level and at the bit stream level. Upon successful authentication, BURA users can be automatically classified into a default group specified in the DSpace configuration file (i.e. dspace.cfg). This allows a BURA administrator to grant relevant group privileges to be inherited by group roles.

D Removal of resources

BURA allows and reserves the right to remove a work submitted to a Collection on special circumstances (vide section 4.2.1.16 & 4.2.1.16.1 of chapter 4). This consists of two parts:

- **Withdraw**
  - Removes item from view
  - Does not show up in search results
  - Recoverable

- **Permanently delete**
  - Unrecoverable
  - Handle is not reused
  - Can only be done by a repository administrator

E Usage data

The purpose of the statistics add-on is to promote BURA and author self- or mediated-archiving, by demonstrating the worldwide accessibility and usage (access/downloads) of archived documents. BURA generates various access and downloading reports and offers system statistics for administrator usage, as well as usage statistics on the level of items, communities and collections. This service provides feedback on repository usage (e.g. downloads, citations, etc.). It facilitates statistical analysis from the database.