



Texas Center for Digital Knowledge
University of North Texas
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**A Proof-of-Concept Repository for Learning Objects: Supporting the
Reuse and Repurposing of Redesigned Courses and Their Content**

Functional & Technical Requirements for the THECB Learning Object Repository

Prepared by the THECB LOR Team

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Functional and Technical Requirements for the THECB Learning Object Repository

1. Introduction

The purpose of this document is to identify and specify the functional and technical requirements needed for the Texas Higher Education Coordinating Board's Learning Object Repository (LOR). These requirements are based on a general understanding of what the LOR should support in terms of three areas:

- Administration
- Submission of learning objects
- End user access to the repository and its contents

DSpace, an open source digital repository platform, provides technical foundation for the LOR. The functional and technical requirements, although general, will be specified for a DSpace-based LOR.

Functional requirements address the behaviors of the repository application, and what types of interactions the application should support. Most of the focus in this document is on the functional requirements. When appropriate, specific technical requirements will be listed.

This document serves several purposes. First, it guides the development and configuration of the repository application that will yield an application that supports the three areas of concern. Second, it provides the baseline for use in the system-level assessment that will occur at the end of the project. Third, it provides input into the development of use scenarios that will be used when conducting the user-level assessment near the end of the project.

One of the limitations of this proof-of-concept demonstration project is that no user needs assessment was carried out to inform the requirements. As noted above, these requirements reflect the project team's general understanding of what the LOR should provide and how it should behave.

2. Requirements Related to Administration

The following requirements address various administrative tasks and responsibilities for managing the LOR. Many of these tasks are carried out using the DSpace administrative interface, but some tasks require access to the server to edit configuration files, set indexing policies, and other responsibilities. These requirements do not address the initial installation and basic setup of the DSpace application and related software dependencies.

Functionality	Description & Technical Specifications
Managing User Accounts	
To manage user accounts, provide for the following: <ul style="list-style-type: none"> • Identify users who may register with dspace • Edit the personal information stored for a specified user • Delete a specified user from the system 	The DSpace Administrator (DA) can perform a number of administrative functions on user accounts.
Authorizations and Permissions	
Set up appropriate groups of users within DSpace and have the following responsibilities: <ul style="list-style-type: none"> • Administer groups • Create a group of users • Name the group 	DSpace provides a way to assign a group of authorized users permissions for adding items to the repository, editing metadata records, reviewing submissions, and other tasks.

Functionality	Description & Technical Specifications
<ul style="list-style-type: none"> • Add user to the group • Delete users from the group • Assign permissions to the group 	
<p>Assign authorized users with various permissions including:</p> <ul style="list-style-type: none"> • Specify groups of users permitted to submit to a collection • Specify reviewers, approvers, and metadata editors for a collection's submission process 	<p>The DA can provide each user with appropriate authorizations for working in the DSpace application.</p>
<p>Administer a variety of other policies related to the LOR including:</p> <ul style="list-style-type: none"> • Set a default distribution policy for all items within a collection • Configure who may modify the items within a collection • Configure who may administer communities and collections themselves • List/abort submission processes • Manage bitstreams format registry 	<p>The DA also has other areas of responsibility related to the LOR and its users.</p>
Organizing the LOR	
<p>Structure the repository using DSpace constructs of communities, subcommunities, and collections including:</p> <ul style="list-style-type: none"> • Create/Delete Community/Collection • Edit Community/Collection Home Page • Edit Collection Provenance Description • Specify Collection's Required License • Specify Collection Metadata Defaults • Configure Item Approval Process 	<p>The DA is responsible for setting up communities, subcommunities, and collections. These are DSpace constructs that in the context of the LOR will be translated into Disciplines and SubDisciplines and Courses (communities and subcommunities) and Course Content (collections that contain the learning objects).</p>
<p>Structure the repository for varying levels of granularity of learning objects</p>	<p>The Course Content will be set up in various collections that best present the content of the course in various levels of granularity.</p>
Workflow Customization	
<p>Customize the workflow to allow various authorized users with specific responsibilities</p>	<p>DSpace uses the concept of a workflow that are assigned at the collection level. The workflow can be set so specific groups of authorized users can carry out specific tasks (e.g., submitting an item, reviewing a submitted item, editing metadata records, approving the submitted item be added to the repository.</p>
Customizing Metadata and Metadata Input	
<p>Customize the metadata scheme</p>	<p>DSpace allows the use of one or more metadata schemes that contain elements for describing the learning objects. The Metadata Registry is the tool used by the DA to customize the existing Dublin Core metadata scheme and to add new metadata schemes.</p>
<p>Customize the metadata input pages</p>	<p>DSpace as a file stored in the config directory called input-forms.xml that controls the metadata elements and their order or presentation on the metadata input pages. In addition, this file can be edited to include links to internal DSpace tools</p>

Functionality	Description & Technical Specifications
	(e.g., controlled vocabularies) and external documents (e.g., input rules) to assist the user in creating the metadata records.
Customize license agreements	DSpace, as part of the workflow, requires the granting of a license before an item can be submitted to the repository. The DA can customize the text of the license as suitable to the collection.
Administer Items in Repository	
Manage and administer items once they are in the repository including: <ul style="list-style-type: none"> • Add/Change/Remove Metadata Values • Add/Delete Bitstreams • Expunge Item 	The DA has the capability of acting on all items submitted to the repository, including the actions listed in the bulleted list.

3. Requirements Related to Submission of Learning Objects

The following requirements address the entire process of authorized users submitting learning objects into the repository. The submission process involves logging in to the LOR with an authorized username and password, creating metadata records for items submitted, uploading the files associated with a learning object into the repository, and workflow related considerations.

Functionality	Description & Technical Specifications
User Accounts	
Allow users to register for an account	Users will be able to initiate the registration process for requesting a DSpace account. Users will provide an email address that will serve as the account name. Upon receipt of an email from DSpace, the user will complete the registration process and choose a password for the user account.
Allow users to edit their user profile	Users will be able to set up and edit a user profile that will hold information such as their names and contact information, also enable them to change their passwords.
Submissions	
Allow users to submit to one or more collections	The DSpace Administrator (DA) sets authorizations and permissions to each user. Authorized users will be able to see what collections they have permission to submit to.
Allow users to initiate the submission process	Authorized users will choose a collection to submit an item to.
Allow users to create metadata records	Authorized users will complete metadata records for each learning object they submit to the repository.
Allow users to upload file(s) into the repository	Upon completion of the metadata records, users will be able to upload one or more files associated with the learning object into the repository. When there is more than one file, and one of the files is considered a primary file (e.g., an HTML index page), user can designate it as the primary bitstream.
Allow user to grant a license	Users must grant a license prior to the submission being allowed into the repository.

Functionality	Description & Technical Specifications
Allow specified users to review, reject, and/or edit and then approve a submission	The DSpace workflow allows submissions to be reviewed, rejected, and/or approved before the item is actually put into the repository. The workflow allows the reviewer to edit the metadata record prior to final approval and submission into the repository.
Allow users to see list of submissions in process	Authorized users can save an incomplete submission, and return to it at a later point to continue work on the submission. Authorized users may remove a submission that is not complete.
Allow users to see list of approved submissions	Authorized users can view a list of their submissions that have been approved and are stored in the repository.

4. Requirements Related to End User Access to Learning Objects

The following requirements address the search, browse, and other interactions end users can have with the LOR. There will likely be two sets of users:

- Public users who do not have an account on the LOR
- Public users who do have an account on the LOR

Because some of the learning objects may not be publicly available to all users, access controls may need to be set for some users, who will need to register for an account. All users should be able to search and browse the LOR and at the least see the metadata records associated with the learning objects, even if not all users will have access to the files associated with the learning objects.

Functionality	Description & Technical Specifications
Search	
Search by specific fields in the metadata record: <ul style="list-style-type: none"> • Subject • Title • Learning Object Type • Media Format • Intended Educational Audience • Instructional Method • Author Affiliation 	DSpace allows the customization of the indexing policies to make available certain fields in the metadata record for searching. The bullet list of fields should be considered for searching. These fields will be available for searching from advanced search interface.
Search by Discipline and SubDiscipline	DSpace provides a default Subject Search from its user interface, but this will be customized to search by Discipline and SubDiscipline using the DSpace controlled vocabulary
Search by full text	DSpace provides a full-text search which will be enabled to allow users a keyword-like search of both the metadata and the learning objects (text-based learning objects).
Search for learning objects in Disciplines, SubDisciplines, Courses, and Course Content	DSpace provides for keyword searching within Disciplines, SubDisciplines, Courses, and Course Content (using the DSpace constructions of communities, subcommunities, and collections.
All searches should be case insensitive	The DSpace indexing policy should be set so searches are executed in a case-insensitive manner.
Use truncation and wildcards in searches	Provides methods for refining searches.

Functionality	Description & Technical Specifications
Browse	
Browse by SubDiscipline	Users should be able to see a browsable list of all courses in the repository. This browse should be available on the left navigation bar of the DSpace interface.
Browse by Courses (subcommunity)	Users should be able to see a browsable list of all learning objects in courses in the repository. This browse should be available on the left navigation bar of the DSpace interface.
Browse by Subjects	Users should be able to see a browsable list of subject terms used to describe learning objects for all courses in the repository. This browse should be available on the left navigation bar of the DSpace interface.
Browse by Title	Users should be able to see a browsable list of the titles for all learning objects in courses in the repository. This browse should be available on the left navigation bar of the DSpace interface.
Browse by Date Published	Users should be able to see a browsable list of items submitted to the repository in order of the value in the Date Published field. This browse should be available on the left navigation bar of the DSpace interface.
Browse within Disciplines, SubDisciplines, Courses, and Course Content by the following elements: <ul style="list-style-type: none"> • Titles • Subjects • Media Formats 	Within DSpace communities and collections, users can browse by the elements in the bulleted lists.
Search Results Display	
Display very brief information about learning objects that meet search criteria	The search results display should show the following information: <ul style="list-style-type: none"> • Title • Author Affiliation • Intended Educational Audience • Learning Object Type • Media Format
Show simple item record when choosing an item from the search results	The simple item display should show the following information: <ul style="list-style-type: none"> • Title • Learning Object Type • Discipline and Sub-Discipline • Subjects • Summary • Learning Object's Contents • Intended Educational Audience • Instructional Method • Educational Interactivity Type • Educational Interactivity Level • Typical Learning Time • Difficulty Level • Creation and Ownership Information • Access and Use Rights

Functionality	Description & Technical Specifications
	<ul style="list-style-type: none"> • Date Published • URI
Show full item record when choosing an item from the search results	The full item record should show all available metadata.
Accessing Metadata Records and Learning Objects	
Enable all users to view metadata records for all learning objects	Whether or not a user has registered for an account on DSpace, all users should be able to view the metadata records for learning objects
Enable all or selected users to access the files associated with learning objects	Depending on the agreements for using and repurposing of learning objects in the repository, some objects may be restricted to authorized users. This will require permissions to be set for these users to access the bitstreams.
Enable all or selected users to open, view, and download files associated with the learning objects	Based on the preceding requirement, users will be able to open and view objects (depending on media format, appropriate plugins, etc.) as well as download files.
Other User Features	
Users can subscribe to DSpace collections to receive email notifications	Users can be alerted when new items submitted to specific collections by subscribing to collections.
Users should see recent submissions to the repository on the homepage and within specific Disciplines, SubDisciplines, Courses, and Course Content	Recent submissions should be displayed on the LOR homepage and on the pages for each of the Disciplines, SubDisciplines, Courses, and Course Content collections.