The Texas Course Redesign Learning Object Repository: Research and Development for a Production System

Work Area C – User Requirements

Deliverable September
The Texas Course Redesign Learning Object Repository

Description of the THECB LOR

1. Overview

The Texas Higher Education Coordinating Board’s Learning Object Repository (THECB LOR) is an open repository containing learning objects developed as part of the Texas Course Redesign Project. A learning object, as defined in the IEEE Standard 1484.12.1, is “any entity, digital or non-digital, that may be used for learning, education or training.” A learning object could be a lesson, tutorial, illustration, demonstration, simulation, music, game, broadcast, or map.

The learning objects contained in the THECB LOR are made available free of charge to all THECB members and other educational institutions within Texas so that resources can be repurposed and re-used by a wider range of educators. Course contents are decomposed and organized at four granularity levels: unit, lesson, topic, and free standing learning object. They are available for searching, browsing, retrieving, and downloading.

The THECB LOR is implemented using DSpace, an open source software application for digital repositories. It currently contains 187 learning objects created in one undergraduate-level U.S. history course at the University of North Texas (UNT). More courses will upload their materials on the repository during Phase II. The proof-of-concept repository is currently installed at <http://zed.lis.unt.edu:8083/dspace/> and will be hosted in the Texas Digital Library.

2. End User Interface

The THECB LOR homepage provides end users with a set of functions and features. At this point, the repository interface is only basically customized. Large scope of customization will be carried out using DSpace Manakin in Phase II (see Figure 1).

![Figure 1. THECB LOR Homepage](image-url)
The screen is pretty much what a typical, out-of-the-box DSpace site looks like. On the top of the homepage is the logo of the LOR. One of the search boxes and browsing options are presented in the left navigation column. The links to sign-in, subscription, help file and editing user profile are also located in the navigation column.

The column on the right hand side provides information about the THECB LOR and contacts. The search box in the middle of the screen, under the welcome message, has the same function as the one on the left hand side. All disciplines contained in the LOR are listed under the search box, where the user can choose a discipline to browse the courses within it.

3. Site Structure

The THECB LOR site is structured as follows:

Browse
- Browse by Discipline and Course
  - Discipline Home Page
- Browse by Title
- Browse by Subject
  - Items for Subject
- Browse by Date

Search
- Advanced Search

Sign on to THECB LOR (accessible to technical users only)
- Your Subscriptions
- My THECB LOR
- Start a New Submission
- View Accepted Submission
- Edit Profile
- Administration Tools
- Discipline/Courses
- E-people
- Groups
- Items
- Metadata Registry
- Bitstream Format Registry
- Workflow
- Authorization
- Edit News
- Edit Default License
- Supervisors
- Statistics

Help

About DSpace

The browsing functionality corresponds to four web pages: Disciplines and Courses, Browse by Title, Browse by Subject, and Browse by Date. Clicking on any of the browsing options on the homepage yield more features provided on second-level pages.
**Browse by Discipline and Course**

The Disciplines and Courses page shows a list of disciplines and sub-disciplines and courses within them (see Figure 2). Users can go to a Discipline Home (see Figure 3) or Course Home page by clicking on the name of a discipline or course. Course Home pages are not created yet.

![Figure 2. Screenshot of the Disciplines and Courses page](image-url)
Figure 3. Screenshot of the Discipline Home page for courses in History

Browse by Title

The Browse by Title page displays alphabetically-listed items in the LOR, with information about the data published, title, author affiliation, intended audience, LO type, and media format (see Figure 4). It also allows for searching by entering first few letters in a title in the search box on top of the page. Users can click through a title and view its metadata record (see Figure 5).
**Browse by Title**

<table>
<thead>
<tr>
<th>Date</th>
<th>Title</th>
<th>Author Affiliation</th>
<th>Intended Educational Audience</th>
<th>Type</th>
<th>Media Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jul. 2007</td>
<td>The American Revolution</td>
<td>University of North Texas</td>
<td>Undergraduate Lower Division</td>
<td>Lesson</td>
<td>Multimedia</td>
</tr>
<tr>
<td>Jul. 2007</td>
<td>American Rights</td>
<td>University of North Texas</td>
<td>Undergraduate Lower Division</td>
<td>Lesson</td>
<td>Multimedia</td>
</tr>
<tr>
<td>-</td>
<td>The American System</td>
<td>University of North Texas</td>
<td>Undergraduate Lower Division</td>
<td>Lesson</td>
<td>Multimedia</td>
</tr>
<tr>
<td>Jul. 2007</td>
<td>The Americas Before Columbus</td>
<td>University of North Texas</td>
<td>Undergraduate Lower Division</td>
<td>Lesson</td>
<td>Text</td>
</tr>
<tr>
<td>Jul. 2007</td>
<td>Articles of Confederation: Are You a Political Brainiac Interaction</td>
<td>University of North Texas</td>
<td>Undergraduate Lower Division</td>
<td>Game</td>
<td>Multimedia</td>
</tr>
<tr>
<td>Jul. 2007</td>
<td>Biological Exchange</td>
<td>University of North Texas</td>
<td>Undergraduate Lower Division</td>
<td>Lesson</td>
<td>Multimedia</td>
</tr>
<tr>
<td>Jul. 2007</td>
<td>British and American</td>
<td>University of North Texas</td>
<td>Undergraduate Lower Division</td>
<td>Simulation</td>
<td>Multimedia</td>
</tr>
</tbody>
</table>

Figure 4. Screenshot of the Browse by Title page and the item list

Please use this identifier to cite or link to this item: [http://hdl.handle.net/2158/57](http://hdl.handle.net/2158/57)

**Title:** The American Revolution

**Learning Object Type:** Lesson

**Discipline and Sub-Discipline:** History, United States History

**Subjects:** George Washington, Battle of Saratoga, Revolutionary War, Yorktown, Captain John Paul Jones, Treaty of Paris, American Revolution

**Summary:** This is a single page from Lesson 6. It contains a discussion of the American Revolution and several key battles. It also includes information on the Treaty of Paris.

**Intended Educational Audience:** Undergraduate Lower Division

**Instructional Method:** Multimedia Instruction

**Educational Interactivity Type:** Expository

**Educational Interactivity Level:** Low

**Typical Learning Time:** 20 minutes

**Difficulty Level:** Low

**Creation and Ownership Information:** Created by the University of North Texas with funding by the

Figure 5. Screenshot of part of a metadata record

---

**Browse by Subject**
The Texas Course Redesign Learning Object Repository

The Browse by Subject page displays alphabetically-listed subject terms in the LOR (see Figure 6). It also allows for searching by entering first few letters in a subject in the search box on top of the page. Users can click through a subject term and view a list of items on this subject. The item list is also ordered by alphabet.

Figure 6. Screenshot of the Browse by Subject page

Browse by Date

The Browsing by Date page lists all items in the order of the date they are published in the LOR, with the most recent one on the top (see Figure 7). It allows for searching by typing in a specific year in the search box on top of the page. Users can click through a title and view its record.
The Texas Course Redesign Learning Object Repository

Browsing by Date

Jump to a point in the index: (Choose month) ▼ (Choose year) ▼

Or type in a year: □

Ordering With Most Recent First

Showing items 1–21 of 167.

<table>
<thead>
<tr>
<th>Date Published</th>
<th>Title</th>
<th>Author Affiliation</th>
<th>Intended Educational Audience</th>
<th>Type</th>
<th>Media Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct. 2007</td>
<td>The Presidency of John Quincy Adams</td>
<td>University of North Texas</td>
<td>Undergraduate Lower Division</td>
<td>Lesson</td>
<td>Text</td>
</tr>
<tr>
<td>Oct. 2007</td>
<td>The Election of 1824</td>
<td>University of North Texas</td>
<td>Undergraduate Lower Division</td>
<td>Lesson</td>
<td>Multimedia</td>
</tr>
<tr>
<td>Oct. 2007</td>
<td>Democracy in the Age of Jackson</td>
<td>University of North Texas</td>
<td>Undergraduate Lower Division</td>
<td>Lesson</td>
<td>Text</td>
</tr>
<tr>
<td></td>
<td>The American System</td>
<td>University of North Texas</td>
<td>Undergraduate Lower Division</td>
<td>Lesson</td>
<td>Multimedia</td>
</tr>
<tr>
<td></td>
<td>The Government and the Market</td>
<td>University of North Texas</td>
<td>Undergraduate Lower Division</td>
<td>Lesson</td>
<td>Multimedia</td>
</tr>
<tr>
<td></td>
<td>Government and market</td>
<td>University of North Texas</td>
<td>-</td>
<td>Tutorial</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>test entry</td>
<td>University of North Texas</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Figure 7. Screenshot of the Browsing by Date page and the item list

Advanced Search

The Advanced Search page supports Boolean searching by Title, Subject, Learning Object Type, Media Format, Intended Educational Audience, Instructional Method, and/or Author Affiliation within a discipline or the whole LOR. It also provides the full-text search feature (see Figure 7).

Figure 8. Screenshot of the Advanced Search page

Your Subscriptions
This page displays the courses the user subscribes to (see Figure 9). This feature is only available to technical users who have registered on DSpace.

My THECB LOR

By clicking on the “My THECB LOR” link on the homepage, technical users can go to the page shown above and log in to THECB LOR (see Figure 10).

When the user is logged in, he/she can start a new submission or view accepted submissions by clicking on either of the buttons in the middle of the screen (see Figure 11). The “See Your
Subscriptions” link under these buttons also directs the user to the Your Subscriptions page, as shown in Figure 9.

![Figure 11. Screenshot of the My THECB LOR page](image)

**Edit Profile**

By clicking on the “Edit Profile” link on the homepage, the user can go to the Edit Your Profile page to create/edit personal information or change the password (see Figure 12).

![Figure 12. Screenshot of the Edit Your Profile page](image)
Administration Tools

By clicking on the “Administer” link on the homepage, the user can access the administration tools that he/she is authorized to use. The operations are listed in the left navigation column (see Figure 13).

Help

By clicking on the “Help” link on the left hand side on any page, the user can access the help screen, on which reference information related to the current web page is provided (see Figure 14 for one of the help screens).
4. Functions and Features

**Browsing capabilities**

From the home page, users have a number of options for browsing. THECB LOR allows for browsing by discipline, sub-discipline, course, title, subject, and publication date. Each type of browsing yields its own type of listing.

- **Browse by Discipline and Course:** A hierarchical list of disciplines, sub-disciplines, and course;
- **Browse by Title:** A list of titles of LOs contained in THECB LOR;
- **Browse by Subject:** A list of subject terms assigned to LOs;
- **Browse by Date:** A list of chronically-ordered LOs.

Each discipline can include one or more sub-disciplines and each sub-discipline may consist of one or more courses. By clicking on a discipline (e.g., History Courses), sub-discipline (e.g., U.S. History), or course (e.g., U.S. History 1), users can further browse the collection by Title, Subject, and Media Format.

At the course level, decomposed course contents are presented at four levels of granularity: unit, lesson, topic, and free standing LO. Each course may have many units; each unit may
include many lessons; and each lesson is broken down into at least two topics. The topics in a lesson are also treated as individual LOs. Free standing LOs are individual files such as simulation and maps. Other resources include course-wide assessments, case studies, and case study teaching guides.

**Searching capabilities**

The two search boxes on the homepage allows for full-text searching of indexed LOs. The Advanced Search feature enables Boolean searching in selected disciplines by course, title, subject, learning object type, media format, intended educational audience, instruction method, and author affiliation.

**Results display**

A typical list of items (search results or browsing lists) in THECB LOR consists of six fields: Date Published, Title, Author Affiliation, Intended Educational Audience, Type, and Media Format, as shown in Figures 4 and 7. The items are ordered alphabetically by title.

By clicking through a title, the user can view the full metadata record, which contains more elements. Metadata elements used in THECB LOR for a LO include: Title, Learning Object Type, Discipline and Sub-Discipline, Subjects, Summary, Intended Educational Audience, Instructional Method, Educational Interactivity Type, Educational Interactivity Level, Typical Learning Time, Difficulty Level, Creation and Ownership Information, Access and Use Rights, Date Published, URI, Appears in Courses, Size, and Format. The record also provides the IMS Content Package URI if available.

The LOR also provides a metadata record for an IMS Content Package, which is a downloadable package of all resources in one lesson or topic. This type of metadata records is not as comprehensive as the ones for individual items. It provides information about the Title, Learning Object Description, URI (for the IMS Content Package), Appears in Course, Size, and Format.

**Viewing LOs and downloading IMS Content Packages**

THECB LOR allows users to open and view LOs by clicking on the “View/Open” link in the grey box at the bottom of each record (see Figure 15). Also, users can download the IMS Content Package as a whole and import the learning object content to a Learning Management System (LMS) such as Angel and Blackboard's Vista.
Submitting LOs into THECB LOR

This functionality is available to authorized technical users only. During Phase I, file upload and metadata creation were conducted manually. The users initiate the submission process by logging into the LOR and clicking on the “Start a New Submission” button (see Figure 11). Afterwards, the user selects an appropriate place in the collection to put the file(s), describes the important attributes, uploads the file(s), verifies the submission, grants the license, and at last completes the submission. Please refer to the Workflow document for detailed instructions.

5. A Sample Use Case Scenario

A use case describes how the actor interacts with the system to achieve a specific goal. Each use case is a complete series of events, from the point of view of the actor. One or more scenarios may be generated from each use case, corresponding to the details of each possible way of achieving that goal.

A sample use case scenario is presented in Figure 16.

**Primary Actor:** Educator  
**Level:** User goal  
**Precondition:** Educator has permission to READ and download IMS Content Packages.  
**Main success scenario:**  
1. Educator has the LOR provide a list of sub-disciplines and/or courses within a discipline.  
2. Educator selects one course that he/she think could help develop his/her own course.  
3. Educator has the LOR provide a list of decomposed course content.  
4. Educator selects one LO that he/she think could help develop the course.
Narratives and screenshots of each step encompassed in this scenario are listed as follows:

1. A history professor at TAMU is going to redesign one of his undergraduate-level courses. He goes to THECB LOR to find some resources that might help. He browses by Discipline and selected “U.S. History” under the History discipline from the list. Please see Figures 17 and 18 for the sequences of actions.
Disciplines and Courses

Shows below is a list of disciplines and the courses and sub-disciplines within them. Click on a name to view that discipline course home page.

- History Courses
  - U.S. History
    - U.S. History 1
      - A. Course Structure
      - B. Course-wide Assessments
      - C. Complete Course
      - D. Course Units
      - E. Course Lessons and Related Assessments
      - F. Course Topics
      - G. Case Studies and Case Study Teaching Guides
      - H. Free-Standing Learning Objects
      - I. IMS Content Packages

- Sociology Courses
  - A. Free-Standing Learning Objects

- Test
  - Test!

Figure 18. Select U.S. History

2. The educator selected the first course listed on the Discipline Home page (see Figure 18).
3. The educator decides to browse all the titles within the U.S. History 1 course (see Figure 19).

4. The educator browses the list returned to him and finds that a lesson titled “Central and South American Indian” is exactly what he wants (see Figure 20).
5. The educator goes into the record, reads through the metadata, and opens the HTML file (see Figure 21). The LO is opened in a new window (see Figure 22).

<table>
<thead>
<tr>
<th>Date</th>
<th>Course Title</th>
<th>University of North Texas</th>
<th>Level</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug. 2007</td>
<td>Protestant Theology Interactive</td>
<td>University of North Texas</td>
<td>Undergraduate</td>
<td>Game</td>
</tr>
<tr>
<td>Jul. 2007</td>
<td>Central and South American Indians</td>
<td>University of North Texas</td>
<td>Undergraduate Lower Division</td>
<td>Lesson</td>
</tr>
<tr>
<td>Jul. 2007</td>
<td>Challenges to Spain's Empire</td>
<td>University of North Texas</td>
<td>Undergraduate Lower Division</td>
<td>Lesson</td>
</tr>
<tr>
<td>Jul. 2007</td>
<td>Changes in Europe</td>
<td>University of North Texas</td>
<td>Undergraduate Lower Division</td>
<td>Lesson</td>
</tr>
<tr>
<td>Oct. 2007</td>
<td>Changes in Transportation</td>
<td>University of North Texas</td>
<td>Undergraduate Lower Division</td>
<td>Lesson</td>
</tr>
<tr>
<td>Aug. 2007</td>
<td>Changing Values of Imports and Exports Interactive</td>
<td>University of North Texas</td>
<td>Undergraduate Lower Division</td>
<td>Demonstration</td>
</tr>
<tr>
<td>Jul. 2007</td>
<td>Colonial Cities</td>
<td>University of North Texas</td>
<td>Undergraduate Lower Division</td>
<td>Lesson</td>
</tr>
<tr>
<td>Jul. 2007</td>
<td>The Colonial Experiment</td>
<td>University of North Texas</td>
<td>Undergraduate Lower Division</td>
<td>Lesson</td>
</tr>
<tr>
<td>Jul. 2007</td>
<td>Colonial Governments</td>
<td>University of North Texas</td>
<td>Undergraduate Lower Division</td>
<td>Lesson</td>
</tr>
<tr>
<td>Jul. 2007</td>
<td>Colonials Grow Suspicious</td>
<td>University of North Texas</td>
<td>Undergraduate Lower Division</td>
<td>Lesson</td>
</tr>
<tr>
<td>Jul. 2007</td>
<td>Colonies on Eve of Revolution</td>
<td>University of North Texas</td>
<td>Undergraduate Lower Division</td>
<td>Lesson</td>
</tr>
</tbody>
</table>

**Figure 20. Select a LO**

**Figure 21. Open the file for the LO**
United States History

Central and South American Indians

By the time Christopher Columbus first set eyes on the Americas, more than fifty million people lived in North and South America and about four million live what we now know of as the United States. The earliest, most complex native civilizations developed near the shores of Panama, which divides North and America. These civilizations were:

Mayas

Web Field Trip

Learn more about the Mayas by reading the travel journals of John Lloyd Stephens who "discovered" the Mayan city of Copan in 1839.

Want to see the Paga Codex online? The Paga Codex is a digital version of a Maya hieroglyphic book. It is only one of four pre-Columbian books that survived the book burnings during the Spanish Conquest.

Mayan culture developed in three regions of Mesoamerica between 300 and 900 AD with the most important development occurring in the central part of Mesoamerica in the tropical rain forest. The Mayas developed a sophisticated approach to astronomy, created a calendar that was more accurate than the one Europe, conceptualized a sophisticated mathematical system including a figure to represent zero, and created the most complex system of writing in the Americas. Tikal, one of the largest Mayan cities, was a trading empire centered around Tikal and had a population of 100,000 at its peak. Because the economy was centered around agriculture, Mayan farmers built canals to water the crops. Numerous Mayan texts exist, containing rich detail about Mayan history, as well as the religious beliefs, which included human sacrifice and self-mutilation. Mayan culture began to decline after the fall of Tikal in 750 AD. By the time the Toltec, a militaristic society, conquered most of Central America and Central Mexico in the 10th century, Mayan urban centers had collapsed and the population dispersed into the surrounding countryside. Today their descendants live in Guatemala, Chiapas, Mexico, the Yucatan Peninsula, and Belize where they have held tenaciously to their culture and traditions. They continue to speak their languages, wear traditional clothing, follow long established rituals, and incorporate their beliefs into practice of Christianity.

Figure 22. Content of the LO in a new window

The educator in this use case successfully finds a LO he wants. After that, he may repeats steps 2, 3, 4, and/or 5 until he obtains sufficient resources for his own course. There are some other scenarios included in this use case in which the educator can achieve the same goal.