Learning Objects: An Expedition from Archival Collection to Online Collaboration

By Shu Liu[1]

Abstract: People of Chinese origin have lived in British Columbia, Canada, since the beginning of non-aboriginal settlement. Many of them have left Chinese-language records that are valuable for the study of Chinese immigrant history. This article provides information about a pilot project completed at the Asian Library of the University of British Columbia to build a learning-object repository using an archival collection of historical Chinese language materials. The collection supports the undergraduate curriculum Chinese-Canadian history. This article introduces the definition and characteristics of learning objects and learning-objects metadata resulting from the project's investigation and the author's experience with selecting and testing systems to develop a prototype of a learning-object repository.

Keywords: learning objects, learning-object metadata, learning-object system, Plone, CAREO, Chinese-Canadian history, archival collections, Historical Chinese Language Materials in British Columbia, HCLMBC, Asian Library, The University of British Columbia

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People of Chinese origin have lived in British Columbia, Canada, since the beginning of non-aboriginal settlement. Many have left behind manuscripts, newspapers, correspondence, genealogical and family records, business transaction records, association records, certificates, receipts, textbooks, photographs with captions, catalogues, and other documents in the Chinese language.[1] These materials vividly reflect how Chinese immigrants have settled, struggled, grown, and thrived in a foreign land and are of significant value to the study of Chinese-immigrant history, migration to North America, and the migration's economic, political and social effects.

To support a growing research interest in Chinese settlement in British Columbia, the Asian Library at the University of British Columbia (UBC) has cooperated with a number of local institutions to develop a Web site, *Historical Chinese Language Materials in British Columbia (HCLMBC): an Electronic Inventory*.[2] The Web site encompasses an online database of records of archival materials, a virtual exhibition of photo and image collections, links to related resources, and listings of relevant organizations. The HCLMBC database is built on the strength of the library's existing archival collections, including a rich body of publications of clan associations from southern Guangdong Province, Mainland China, and the *Chinese Times* (1914-1992), the longest run of any Chinese newspaper in Canada. The database records are further expanded through partnerships with numerous Chinese Canadian pioneer families, clan and community associations, local and international archives, resource centers, and pertinent individuals. Since the project's inception in 2000 to the end of 2004, the HCLMBC database had included over 13,000 records of archival materials, and the HCLMBC Web site had incorporated more than 500 relevant photos and images. By

then, the core collection of the database had been established, and the focus of the

HCLMBC project moved to digitization of major collections by stages.[3]

During the same period, UBC actively established and promoted a campus-wide

initiative, *e-Strategy*,[4] which includes *e-Learning*, *e-Research* and *e-Community*, to

support the university's strategic goals in enhancing learning, research, and community

through leading-edge technology initiatives. Led by the Office of Learning Technology at

UBC, the learning-objects technology was introduced and discussed on campus as part of

the *e-Learning* initiative, through the channels of the *e-Learning* Web site[5] and a UBC

Wiki[6].

The Pilot Project

As the focus of the HCLMBC project moved to digitization, the head librarian at

the Asian Library was actively seeking a way to integrate the HCLMBC archival

collection, including the online database and the online exhibition of photos and images,

with university teaching in the subject. The learning-objects technology provided such an

outlet and earned her interest and attention.

The head librarian pursued support from a faculty member of the history

department at UBC, who was teaching a junior/senior undergraduate course on Chinese-

Canadian history, to investigate developing a learning-object repository using the

archival collection. The faculty member expressed interest in the idea, and the library

hired a graduate student from the library school at UBC to work on the pilot project. The

project team included the head librarian, the faculty member, the graduate student, and a

staff member from the library who managed the HCLMBC project.

An initial discussion with the faculty member identified student activities associated with the course, which included individual and group study, online discussions, and research projects that would generate products in the form of Web sites. The learning-objects repository would be able to support these activities. As a team, we identified the following project objectives.

- Investigate the topic of learning objects in relation to the archival materials

- Identify materials for inclusion from the HCLMBC archival collection, and develop, if possible, learning objects based on selected materials

- Investigate possible systems to carry, present, and use learning objects

- Create an online prototype highlighting early migration and Chinatowns.

Investigate Learning Objects

The definition of learning objects has been a much-debated topic since 2000. IEEE defines them as[7] "any entity, digital or non-digital, that can be used for learning, education or training." Wiley (2000)[8] defines them as "any digital resource that can be reused to support learning." These definitions are general, and many other researchers, institutions, and learning-object initiatives[9] have debated their visions. We spent about one month investigating the theories and identified learning objects as pieces of an online tool, such as a tutorial, a diagram, an illustration, a model, an interactive exercise, that has a learning objective, a learning process, and a means of assessment regarding a specific task or a specific piece of knowledge. Within this definitional framework, characteristics of learning objects can include the following.

- Nature: learning objects are digital, and use and distribution of learning objects are in an online environment

- Purpose: functionally, learning objects are to support distance learning; theoretically, learning objects are building blocks of course content

- Size: a learning object is the smallest entity that contains a single complete meaning to carry out a learning process

- Structure: a learning object usually contains a learning objective, an instructional method, learning content, mechanisms for practice, and a means of assessment

- Creation: creation of learning objects may need expertise from the disciplines of instructional design, computer programming, multimedia design, and library and information science

- Discovery and sharing: learning objects are discoverable, sharable, and assessable through the description of learning-object metadata.

Was there a connection between the archival materials and learning objects? The answer to this question was yes, with concerns. The first concern came from the nature of the materials. Some of the materials were digitized, such as the online exhibition of photos and images, while others were still in their original forms, such as paper, photo, or artifact, with only database records. Digitization of these items would be necessary for these materials to become learning objects.

The second concern arose from the structure of learning objects. The digitized archival materials needed to be sequenced, combined, arranged, and furnished with necessary explanatory text, questions, or exercises to fulfill an explicit learning objective. We agreed that original archival materials can serve as the basis of learning objects, and

the transformation requires digitization, instructional design, and some computer techniques to integrate digital objects and their appendices.

We also identified well-recognized learning-object metadata schemas, such as Learning-object Metadata[10] of the Institute of Electrical and Electronics Engineers, Inc. (IEEE) and Learning Resource Meta-data Specification[11] of the IMS Global Learning Consortium, Inc. (IMS). IEEE's standard is a conceptual model of learning-object metadata schema. IMS's specification is to provide users of IEEE's standard a narrative description of the data model along with guidelines on its use, including the creation of application profiles.[12] Both the standard and the specification provide mapping to Dublin Core (DC). Canadian Core Learning-object Metadata Application Profile (CanCore)[13] is one of the application profiles of the IMS specification and provides best practices for creating learning-object metadata in the Canadian educational context.

Select Materials and Develop Learning Objects

The majority of our materials to develop the prototype site came from the image gallery on the HCLMBC Web site. The online photo and image collections were arranged by donors, such as clan families and museums; and topics, such as Vancouver Chinatowns and Chinese cemeteries. This arrangement helped us choose and place samples into a content model (see Appendix A) which we had developed to reflect the structure of the course and identify learning units. We also included a number of materials which had only archival records in the online database. Digitization of these materials was coordinated by the manager of the HCLMBC project. Meanwhile, we consulted related online resources and visited relevant organizations' Web sites. Then we

selected a small number of materials which were covered by neither the image gallery nor the archival database to support some categories established in the content model.

By the time we were ready to implement the content model and develop a prototype site, we had more than 50 images covering primarily early migration and Chinatowns, the two areas we wanted to highlight as stated in the project objective. We arranged these materials into the content model according to their temporal coverage and themes represented and collected information about them as completely as possible. This information came from the archival records, accompanying descriptive information, and sometimes the images themselves, which we would use to compose learning-object metadata and construct any possible learning context.

Test Systems

We initially identified Campus Alberta Repository of Educational Objects (CAREO), [14] which was readily available and tested at the time on campus as an institutional repository model, to develop our online prototype. Due to the frustrations encountered with CAREO (see Table1), we consulted the Office of Learning Technology about possible alternative systems. We discussed our expectations of system functionalities with the Learning-objects Coordinator and the e-Learning Web Coordinator and demonstrated our content model with samples from the selected set of digital objects. Based on their understanding of our purpose, the coordinators recommended Plone, [15] an open-source content management software that the office was testing in-house, as an alternative system to develop our prototype site. Our experiences with CAREO and Plone are illustrated and compared in Table 1.

Table 1. System Comparisons of CAREO and Plone

Categories	CAREO	Plone
Nature	Multidisciplinary learning-object repository	Open-source content management system
Ability to reflect the content model (See Appendix A)	No, display is at an object level, mixed with objects from other disciplines	Yes, the system allows construction of a folder structure and display is hierarchical
Media support	Multimedia	Multimedia, but not audio or video
Language support	English only	Multi-language, including traditional and simplified Chinese
User authorization	Yes	Yes
Differentiation in user privileges	No	Yes – member, reviewer, manager, owner
Ability to create learning-objects on site	No, learning-objects are created off site and uploaded to the repository, although the "description" field and the "discuss" function may help provide auxiliary text to images	No, learning-objects are created off site and uploaded to the system, although system supports creation of Web pages and the "description" field and the "add comment" function may help provide auxiliary text to images
Metadata	Fixed metadata template according to CANCORE guidelines; comprehensive	Fixed metadata template generated by the system, including of Title, Description, Keywords, Effective/Expiration Date, Format, Language, Copyrights and Contributors; simple

Ability to support individual study	Yes, objects can be viewed online on an individual basis	Yes, objects can be viewed online on an individual basis
Ability to support group study	Yes, objects can be viewed online in a group setting	Yes, objects can be viewed online in a group setting
Ability to support online discussions	Yes, the repository provides "discuss" function at an object level	Yes, the system provides "add comment" function at an object level; the system also supports establishment and activities of "discussion forums"
Other support for user interactions	None	Establishment of online member profiles helps members to know each other better; ability to search members; ability to create member home pages; ability to "share" and "syndicate" resources
Ability to download objects	Not intuitive, although images can be "copy" and "paste"	Not intuitive, although images can be copied and pasted
Ability to submit and review objects	No	Yes
Ability to set object status	No	Yes – "make private", "visible", "submit", "publish"
System stability	Questionable – frequently down on a daily basis during testing	Good – no down time experienced during testing

Through testing, we concluded a learning-object system should provide the following functionalities.

- Support for display and integration of multiple media formats

- Ability to organize objects into logical structures

- Mechanisms to design and modify a metadata template

- Methods of submitting, reviewing and using objects

- Various ways of online user interactions.

These criteria will be valuable for us to evaluate learning-object systems when relevant technology becomes more mature.

Create Prototype

The e-Learning Web Coordinator helped us create a prototype site using the Plone software (also see Appendix B).[16] The coordinator localized the software to reflect our project purpose and set up a site-manager account. We copied the initial set of selected images on a CD-ROM, and the coordinator batch loaded them to the site. With the site-manager account, we further added metadata to the initial set of images, perfected the site structure, and complemented the site with additional images and resources. At a final stage of the prototype, we had 102 images covering most of the categories established in the content model (see Appendix A) and added a list of educational video resources available at UBC libraries that would support study of the course (see Appendix B).

Conclusion

The pilot project generated positive impact in a number of ways. It gained us valuable knowledge on the learning-objects theory and experience with developing a learning-object repository. It demonstrated the library's commitment to enhancing

university students' learning resources and increased the library's visibility in the university's technology initiative. The online repository brings immediate, central access of archival materials to students from remote and diffused locations. The faculty member was excited to incorporate this innovative online tool into his teaching and was ready to become manager of the prototype site so he could further contribute materials and manipulate them to fit the context and learning objectives of his course. The prototype site was an initial step showing how library resources could integrate with faculty teaching in an online environment. Based on the experience with the prototype, the head librarian was interested in enlarging the attempt to work with other faculty members in the history department and developing a research repository of a larger scope to support the study of overall Asian immigrant history and migration in North America. A plan for expansion based on the prototype was to extend material formats to digitized versions of oral history and educational videos. Moreover, demonstration of the prototype site during the head librarian's visit to Mainland China attracted further contribution of archival materials to the HCLMBC collection from local libraries, archives, and museums. This demonstrated the pilot project's impact on increasing the archival collection's visibility and generating broader interest to enrich its research value.

The pilot project suggests that libraries should take a proactive role in their institutions' information and learning technology initiatives, and make use of library resources in a more dynamic and timely manner. From it, we learned that it is beneficial to communicate with teaching faculty to explore ways of creative use of library resources. In addition, information technology units on campus are quality resources to rely on to resolve technological issues and obtain relevant advice.

The next steps of the pilot would be to evaluate the prototype based on faculty and student experiences, to enhance the initial set of digital objects based on the definitional framework of learning objects, and to promote this endeavor to a larger audience if broader partnerships are to be sought.

Footnotes

1. http://www.sfu.ca/davidlamcentre/hclmbc/introduction.html

2. http://www.sfu.ca/davidlamcentre/hclmbc/index.html

3. http://www.sfu.ca/davidlamcentre/hclmbc/introduction.html

4. http://www.e-strategy.ubc.ca/Homelink.html

5. https://www.elearning.ubc.ca/home/index.cfm

6. http://careo.elearning.ubc.ca/cgi-bin/wiki.pl?FindLearningObjects

7. http://ieeeltsc.org/wg12LOM/lomDescription

8. http://opencontent.org/docs/dissertation.pdf

9. http://www.wisc-online.com/Info/FIPSE%20-
   %20What%20is%20a%20Learning%20Object.htm;
   http://learnet.hku.hk/objects.htm; http://www.fastrak-
   consulting.co.uk/tactix/features/objects/objects.htm

10. http://ltsc.ieee.org/wg12/files/LOM_1484_12_1_v1_Final_Draft.pdf

11. http://www.imsglobal.org/metadata/index.html

12. http://www.imsglobal.org/ap/apv1p0/imsap_oviewv1p0.html

13. http://www.cancore.ca/en/

14. http://www.careo.org/

15. http://plone.org/

16. http://142.103.172.228:8080/chicanhistory

Additional Reading

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%20What%20is%20a%20Learning%20Object.htm

CONTENT MODEL

Early Migration and Settlement (in total: 71)
- Gold Rush (6)
- CPR Construction (8)
- World War I (1)
- Settlements
    - Chinatowns
        - Victoria (3)
        - Vancouver (4)
        - Richmond (1)
    - Communities
        - Chinese Empire Reform Association (8)
        - Chinese Freemasons (6)
    - Issues
        - Bachelor Society (1)
        - Head Tax (1)
        - Racism (1)
        - Women & Family (2)
    - Pioneer Families
        - Yip Sang Family
            - Business (3)
            - Customs (1)
            - Family (3)
            - Trans-Pacific Ties (2)
    - Social Life
    - Business (6)
    - Customs (2)
    - Education (3)
    - Media (1)
    - Personal Activities (8)

Exclusion Period and Wartime (in total: 21)
- Exclusion Act (0)
- Japanese Invasion - World War II
    - Events (1)
    - Historical Sites (1)
    - Profiles
        - Men
            - Cedric Mah (3)
            - Force 136 (2)
            - Other Distinguished (1)
        - Women (3)
    - Trans-Pacific Ties (4)
- Settlements
    - Chinatowns
        - Richmond (2)
    - Communities (1)
    - Social Life
        - Business (2)
        - Education (1)

Post-War and the Recent (in total: 10)

- Vancouver Centralization
    - Vancouver (1)
    - Richmond (4)
- Steady Growth (0)
- New Immigrants
    - Settlements
        - Richmond (4)
    - Trans-Pacific Ties (1)

Appendix B

SCREEN CAPTURES OF THE PROTOTYPE SITE AT PLONE

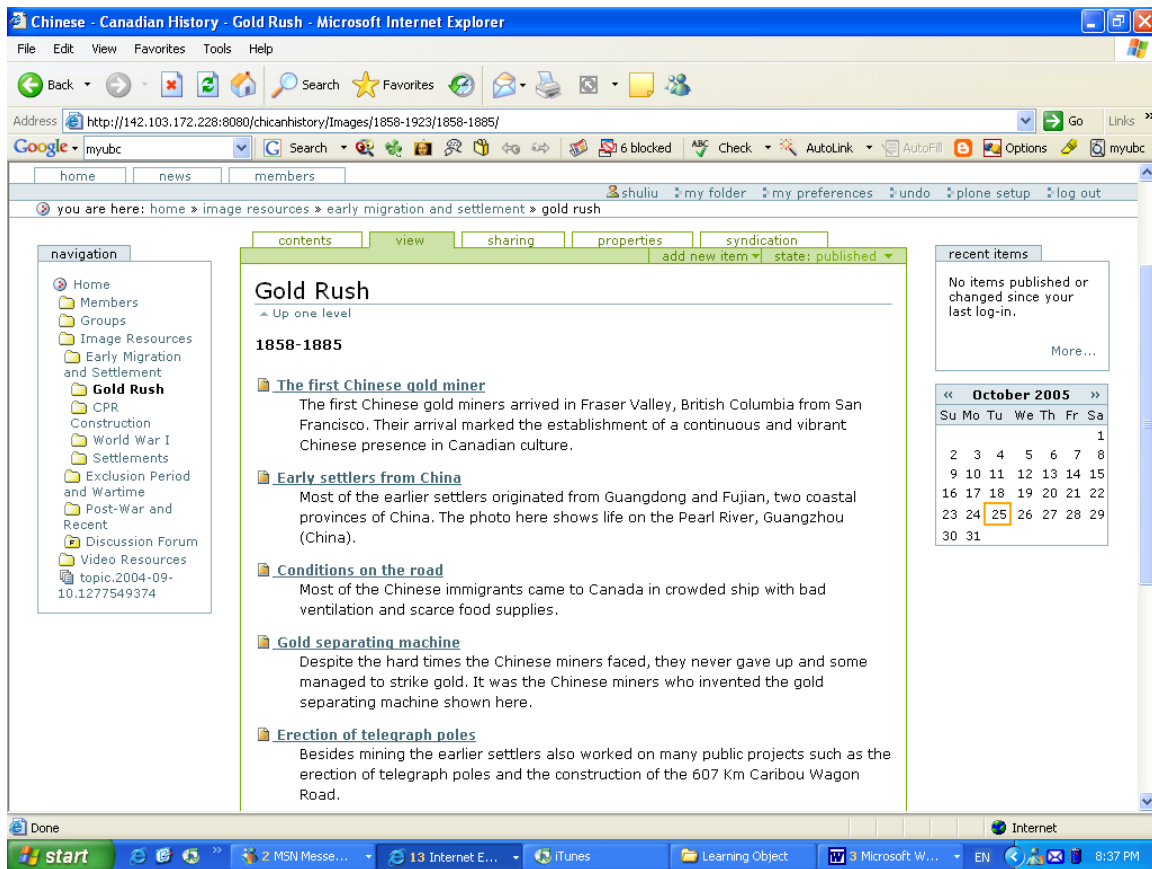**Figure 1. Chinese Canadian History Learning-object Repository Prototype: Home Page**

Screen capture courtesy of Eleanor Yuen and the pilot Learning Object Project at the Asian Library of the University of British Columbia.

Figure 2. Chinese Canadian History Learning-object Repository Prototype: Hierarchical Display Sample I
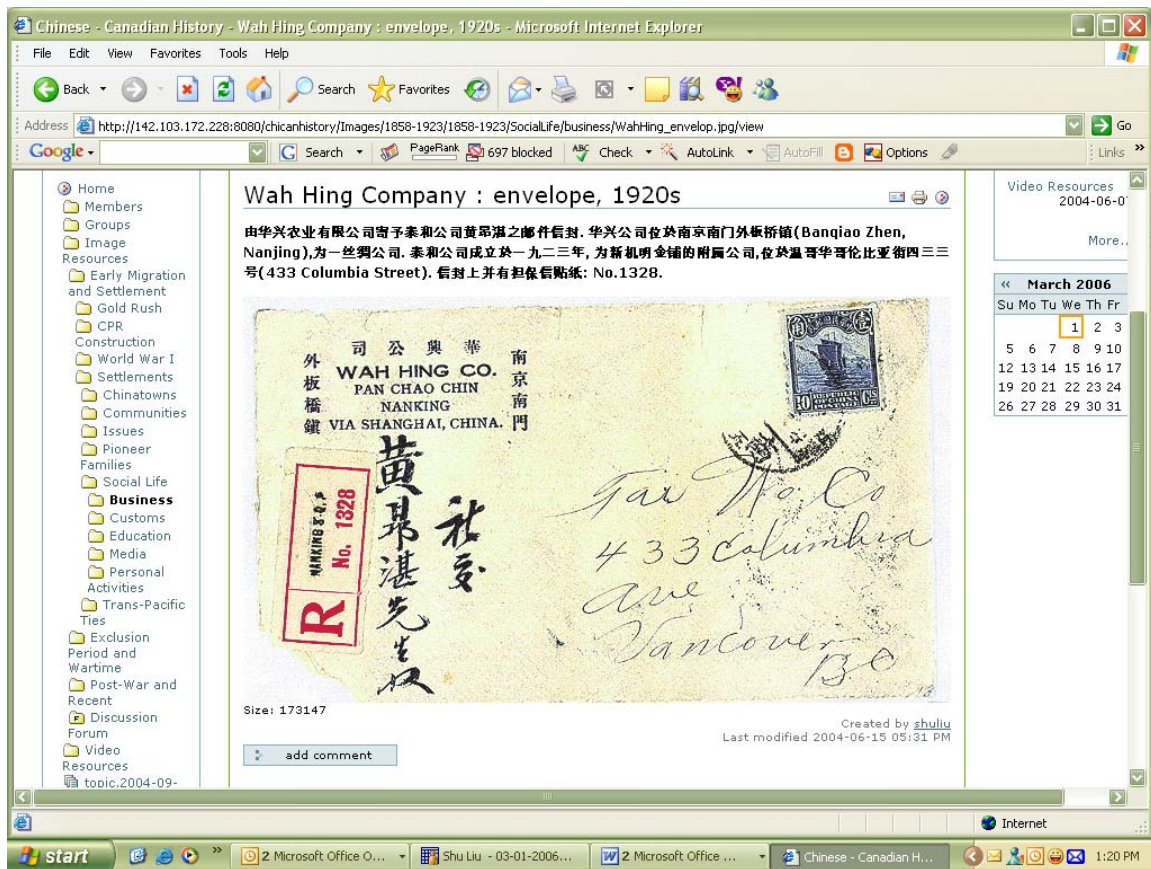

Screen capture courtesy of Eleanor Yuen and the pilot Learning Object Project at the Asian Library of the University of British Columbia.

Figure 3. Chinese Canadian History Learning-object Repository Prototype: Hierarchical Display Sample II
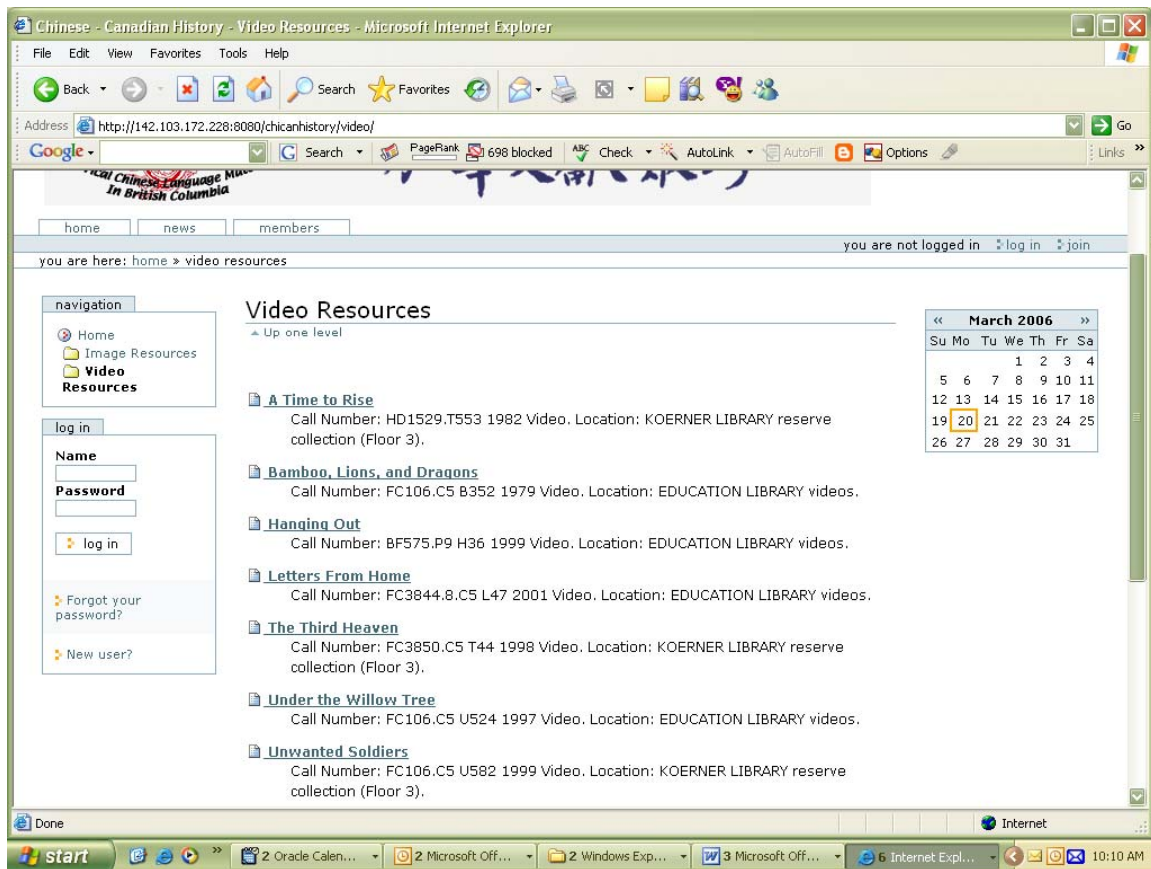

Screen capture courtesy of Eleanor Yuen and the pilot Learning Object Project at the Asian Library of the University of British Columbia.

Figure 4. Chinese Canadian History Learning-object Repository Prototype: Object-level Display Sample

Screen capture courtesy of Eleanor Yuen and the pilot Learning Object Project at the Asian Library of the University of British Columbia.

Figure 5. Chinese Canadian History Learning-object Repository Prototype: Video Resources

Screen capture courtesy of Eleanor Yuen and the pilot Learning Object Project at the Asian Library of the University of British Columbia.