

MANAGING AND DOCUMENTING ACADEMIC COURSE CURRICULUM INFORMATION

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ABSTRACT

The University of Athens received a grant to support digital collections and provide information, regarding all educational and research activities through an academic portal. Thus, the possibility to provide information for all courses taught in each academic semester in a systematic way was explored. Academic staff members usually provide information for the courses they teach through their own web pages, which students access to download supplementary material, as presentations or papers related to a specific lecture or even the timetable of lectures. Instead of accessing staff personal pages, it would be easier for students to obtain course related information through the Library web pages, where they could find informational material for all courses in a unified fashion. The digital library system presented in this paper was built as a supplementary tool for tutors and students that normally attend at a specific department's courses. Information related to all courses is documented using digital material metadata standards. For this purpose the Dublin Core metadata scheme was adopted and properly extended. The system must be able to provide information to the academic portal and cooperate with existing harvesters, operating in an automated fashion.

1. INTRODUCTION

The University of Athens initiated a digital collection and information portal development project funded by the Greek Government to provide enhanced educational capabilities, disseminate digital educational material and preserve research material produced by its laboratories and researchers. Students and researchers access digital material mainly for educational purposes. The project aims at two targets: a. gather digital material for educational purposes (either digitized or produced in digital form) and b. access all digital material through an Information Portal developed by the Libraries Computer Centre.

In this paper, we discuss the Digital Library platform, named *CourseDL*, developed for documenting the progress of academic courses and managing supplementary informational material regarding them. The purpose of this activity is to support teaching activities and provide information and supplementary material for all courses offered by different University Departments following their progress through academic semester. Thus, it is possible to provide information for all courses taught in each semester in a systematic way.

Academic staff members usually provide information for the courses they teach through their own web pages, which students access to download supplementary material, as presentations or papers related to a specific lecture or even the timetable of lectures. Additionally, students may also download exercise material or even upload their own exercises. Instead of accessing staff personal pages, it would be easier for students to obtain course related information through the Library web pages in a unified fashion. The digital library system presented was built as a supplementary tool for tutors and students that normally attend at a specific department's courses. Creating an e-learning system was out of our scope. The system provides access to information concerning academic courses. It also facilitates tutors to upload and document supplementary material related to each lecture, instead of updating a web page. Thus, the system should be easy to use. Information related to all courses is documented using digital content metadata standards. For this purpose the Dublin Core metadata scheme [1] was adopted and properly extended. The system must be able to provide information to the academic portal and cooperate with existing harvesters, operating in an automated fashion. Thus, the Open Archives Initiative Protocol for Metadata Harvesting [2] is supported.

The rest of the paper is organized as follows: In section 2, the information maintained for each course and related metadata are presented. In section 3, the functionality of the system is discussed. Conclusions reside in section 4.

2. DIGITAL MATERIAL AND METADATA REPRESENTATION

Course related information is stored within CourseDL in the form digital objects, used to represent digital content. Three digital object types were introduced: *Academic course* digital object represents a course offered by a specific University Department. *Lecture* digital object represents lectures given as part of a specific course. Finally, *supplementary material* digital object contains supplementary digital material related to a specific course or lecture. Such elements can be a PowerPoint presentation used during a lecture, an audio file of the recorded lecture in mp3 format or an exercise related to the specific lecture or course. All information previously published in the course web page is treated as supplementary material. Digital objects are presented to users as dynamically created XML pages according to METS [3] standard, and provide links to related digital objects. Digital objects used to describe course related information and their relations are depicted in figure 1, using UML notation.

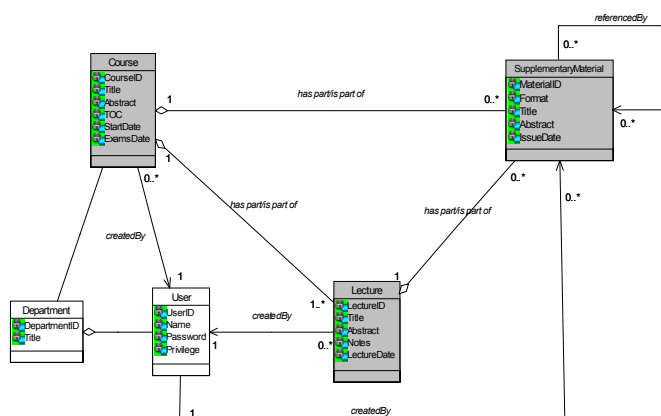


Figure 1. Course-related digital objects and supporting entities

As indicated in the figure, supporting entities have also been declared, namely *user* and *department*. The *user* entity provides information about the system’s users (students, tutors and administrators). Different privileges may be defined to clarify who are in charge of “posting” material in the system. A user may create a new course and provide information about it as well. The *department* entity represents the departments belonging to the University. A course is given by a certain department and a user belongs to a department.

The metadata scheme introduced to describe courses, lectures and supplementary material is based on Dublin Core [1], which is a widely adopted standard for digital material. Course related information was mapped to specific Dublin Core (DC) elements, while some elements were omitted. Characterizing course, lecture and material digital objects using DC elements facilitates students with additional information and enhances their searching capabilities. Additional qualifiers of *description* element are introduced, to accurately describe *course* and *lecture* digital objects. The DC *Subject* element is used to characterize courses, lectures and material. Instead of adopting a subject existing schema, such as LC or Mesh [3], keywords defined by the tutor are used, to simplify characterization process. Technical metadata, as DC.Identifier, DC.Type and DC.Format are automatically created by the system. The DC.Relation.HasPart and DC.Relation.IsPart fields are automatically added by the system, when tutors create or update course, lecture and material digital object through the graphical interface.

The DC *Relation* element is used to describe relations between digital objects. Two relation types were identified described by existing *Relation* qualifiers:

- the *IsPartOf/HasPart* relation representing composition. Each course is composed by lectures and its lecture must be part of a specific course. Supplementary Material digital object is usually related to a specific lecture. In rare cases, it may also be related to the course.
- the *ReferencesIs/ReferencedBy* relation representing reference between different supplementary material. This relation is not mandatory and is useful only if supplementary material supporting a specific lecture is related with supplementary material already given by the tutor.

Mandatory elements of a specific digital object may be automatically filled using information from its ancestor to simplify characterization process. For example, if the tutor left the *Creator/Subject* field black, while creating a new *Lecture* digital object, the system automatically fills it using information from the *Creator/Subject* field of the corresponding *Course*.

Metadata are included in corresponding XML pages using RDF representation, conforming to the instructions given in [5]. As an example, the RDF representation of a lecture metadata is depicted in figure 2.

```
<?xml version="1.0"?>
<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:uoadc="http://di.uoa.gr/distributed/DC"
xmlns:dcterms="http://purl.org/dc/terms/"
<rdf:Description rdf:about="http://di.uoa.gr/distributed/corba/corbaForIdiots.pdf">
  <dc:creator>Doe John</dc:creator>
  <dc:title xml:lang="en">CORBA for Idiots</dc:title>
  <dc:subject>
    <rdf:Bag>
      <rdf:li>CORBA</rdf:li>
      <rdf:li>Beginners</rdf:li>
    </rdf:Bag>
  </dc:subject>
  <dc:language>
    <dcterms:RFC1766>
      <rdfs:label>Greek</rdfs:label>
      <rdf:value>EL</rdf:value>
    </dcterms:RFC1766>
  </dc:language>
  <dcterms:abstract>An simple introduction to CORBA</dcterms:abstract>
  <dc:publisher>Prentice Hall</dc:publisher>
  <dc:contributor>George Andrew</dc:contributor>
  <dc:type>text</dc:type>
  <dc:format xsi:type="dcterms:IMT">text/pdf</dc:format>
  <dcterms:IsPartOf xsi:type="dcterms:URI">
    <dcterms:URI>
      <rdf:label>Lecture 2</rdf:label>
      <rdf:value>http://di.uoa.gr/distributed/DC/lecture.jsp?lesson=1&lecture=2</rdf:value>
    </dcterms:URI>
  </dcterms:IsPartOf>
  <dc:identifier rdf:resource="http://di.uoa.gr/distributed/DC/lecture.jsp?lesson=1&lecture=2"/>
  <dc:date scheme="W3C-DTF">1999-11-26 T14:00-03:00</dc:date>
</rdf:Description>
</rdf:RDF>
```

Figure 2. RDF representation of a supplementary material metadata

3. PROVIDED FUNCTIONALITY

CourseDL system is accessible from any web browser. It supports three types of users: administrators, tutors and students. Administrators are responsible for maintaining department, course and tutor lists. Tutors are responsible for adding and editing lectures and supplementary material and update course information for all the courses they teach. Students may perform various search queries and view course, lecture, and material information stored in CourseDL for all courses they take. Two different interfaces are provided to retrieve information. The first one facilitates users to view a catalogue of courses offered the current semester grouped by corresponding curriculum information. Students may choose a course and browse all the lectures given so far. The second one provides extensive searching functionality. Searching is performed using specific metadata fields, as presented in Figure 3. Results are presented in a uniform manner through the *Search Results* page. The user has also the possibility to access lists of the basic entities (course, lecture and material) through which the navigation described above may be performed, as well as the user list, which contains information about the system's users and, when the user is a tutor, allows navigation to the courses provided by the tutor.



Figure 3. Searching Interface

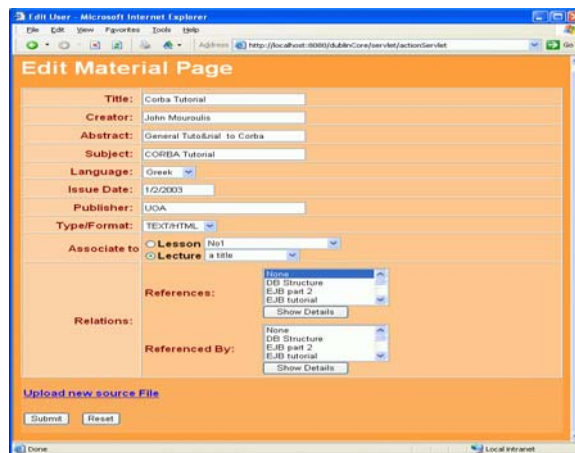


Figure 4. Edit Interface

Privileged user – an administrator or tutor that is – may also edit the information supplied for courses, lectures and supplementary material. It is obvious that a tutor may edit information belonging to a course (lecture/supplementary material) assigned to him/her. Through edit pages, the user may provide, upload or change the information about a specific course, lecture and/or supplementary material (figure 4). Both, searching and edit interfaces are developed in Greek and English language, while special attention was given in usability of edit pages, so that tutor may easily add new content regarding lectures and supplementary material.

CourseDL is designed to interact with both users accessing the system using a web browser, as well as with data harvesters. When a harvester (a search engine) makes a request, the system responds as a repository that conforms to the specifications given by the Open Archives Initiative Protocol for Metadata Harvesting (OAI PMH) [2], which includes the metadata in a XML form. When the harvester gets the URL identifiers pointing to CourseDL digital objects, it may access them. The provision of the OAI PMH interface facilitates the integration of CourseDL into the Information Portal supported for all digital content produced by the University of Athens.

4. CONCLUSIONS

Instead of accessing staff personal pages, it would be easier for students to obtain course related information through the unified web-based environment, where they could find informational material for all courses in a common fashion. The digital library system presented in this paper, namely CourseDL, was built as a supplementary tool for tutors and students that normally attend a specific department's courses. Information related to all courses is documented using digital material metadata standards. Adopting Dublin Core metadata scheme and Open Archives Initiative Protocol for Metadata Harvesting was a wise decision, since it promotes interoperability and facilitates CourseDL seamless integration into the information portal supported by the University.

5. REFERENCE

- [1] Dublin Core Metadata Initiative, <http://www.dublincore.org/>
- [2] The Open Archives Initiative Protocol for Metadata Harvesting, <http://www.openarchives.org/OAI/openarchivesprotocol.html>
- [3] Metadata Encoding and Transmission Standard, <http://www.loc.gov/mets>
- [4] Medical Subject Headings <http://www.w3.org/RDF>
- [5] Guidelines for implementing Dublin Core in XML <http://dublincore.org/documents/2002/07/23/dc-xml-guidelines/>