



## Metadata in the e-learning repository

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### Abstract

The aim of the article is to present the model of knowledge repository based on the metadata standards used to describe the educational course contents using LOM (Learning Object Metadata) as the example. The components of description of metadata on various aggregation levels as well as exemplary tools for metadata edition are presented. The importance of this model for development of e-learning is discussed. Special attention is paid to generalization of dissipated objects and Learning Objects (LO) are such ones and to their effect on reduction of costs related to creating new educational objects on various platforms taking advantage of ready to use courses.

### 1. Introduction

Permanent development of information systems provides new possibilities for man thus contributing to formation of so called information society. Technological progress, increase of intercommunication rate and improvement of software functionality makes it possible to use the knowledge acquired by man in many new dimensions. E-learning and the way of educational contents description in the form of metadata can serve as examples.

### 2. Metadata

The contents must be designed in such a way that it could be used many times and it must be so packed that its localization and automatic systematization in the in-coming catalogue publication could be made [1]. One of the ways to achieve this aim is using metadata. What are metadata? The metadata themselves are often called the data about data or the information about information [2]. Actually metadata are the structural information which describes, explains and locates data or facilitates recovery, use or management of information source.

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At present there are many schemas of metadata and sets of elements. Many organizations dealing with frameworks for metadata. These are, among others, Dublin Core (DC), Metadata Encoding and Transmission Standard (METS), Metadata Object Description Schema (MODS) or Learning Object Metadata (LOM).

### 3. Model LOM (Learning Object Metadata)

Size limitation of this paper resulted in the fact that only the standard LOM, which is a good example of using metadata, is discussed. However, it does not mean that other standards are insignificant. LOM was elaborated by the organization IEEE Learning Technology Standards Committee (LTSC) and included in the standard IEEE 1484.12.1-2002. The metadata schema is hierarchical and includes over 60 elements, determines their interrelations and types of stored values. This is much more than needed for common use and therefore a set of elements indispensable for supplying information about educational contents (this can be a course, a lesson, a module, main object to be shown in a browser) has been stated.,

- general data (object identifier, name, language, description ...),
- history and current state (version, states: working, final, verified ..., co-originator; who, in which role, what, when ...),
- metametadata (assumptive language of description, who and when worked out metadata, ...),
- technical data (format, size, object position, requirements: operation system, version, .... description of installation, time of module realization ....),
- educational data,
- rights for module (paid for with copyrights, description),
- relations with other modules (is a part ....., contains ..., refer to ...),
- commentary (instructions for educational use of the object),
- classification according to a given taxonomic system.

These metadata are included in the tuck in the list form on which the user can make necessary modifications. The list is divided into nine categories (Fig. 1).

Expanded metadata enable objects packing into the standard structure making their placing in repositories, on teaching platform and their distribution among systems possible. The information included in metadata interpreted by schooling platforms makes it possible for the user to look for educational contents and courses on various platforms in dissipated networks (Fig. 2).

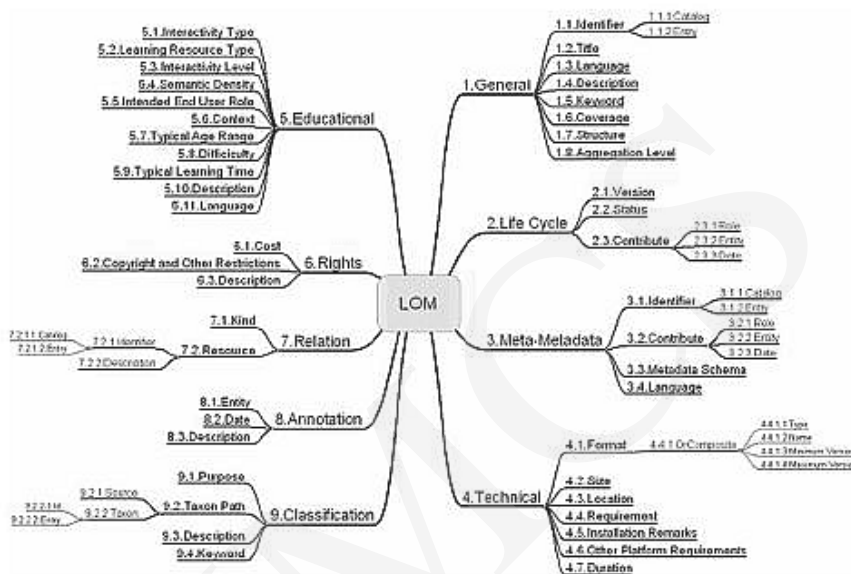


Fig. 1. Schema of metadata according to LOM [3]

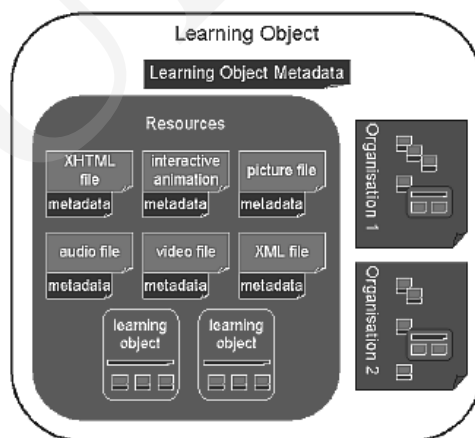


Fig. 2. Example of Learning Object package [4]

The metadata according to the IMS specification have been generally accepted and their aim was to create a common nomenclature describing educational modules in a uniform way. A metadata set is not visible for the learner but it is accessible for the platform and used for interpretation while forming the interface for learners and course creators.

Learning Managements System (LMS) presents a set of functionality aimed at creating, supplying, reporting and administering the course contents and

progress made by learners as well as communication with them. LMS can both cooperate with a very simple educational module and manage a sophisticated complex course [5].

Intelligent teaching and adaptation training are predicted. Metadata play an important role in creating courses as a tool of description of their intention, range of knowledge, level, field etc.. In delivery and presentation of a course in a browser they are a source of information about the author, field and way of presentation (Fig. 3).

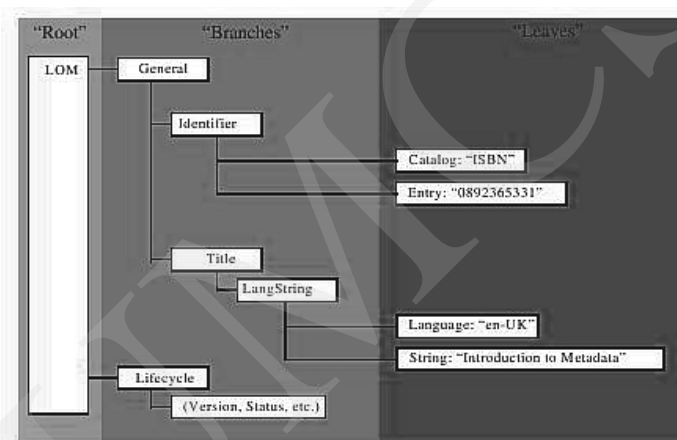


Fig. 3. Metadata on the platform LMS [3]

On the platform LMS they are a source of information about language, field and level of course providing entries commands to be placed in repositories and in search on teaching platforms E-learning specifications use the technology XML (language XML) for giving a way of recording data structures (schemes) related to e-learning and XML is used in the e-learning software:

- for course creation (authoring system),
- for course realization (delivery system, runtime),
- for result reporting,
- for course storage in repositories,
- recording, reading and processing data in XML according to the schemes included in specifications.

#### 4. Metadata editors

Not every program possesses the built-in metadata edition like in the commercial programs for the editions of educational courses and in the Exemplary Microsoft Office. The best way to make use of a self-created course or file in the knowledge repository is description of the course with metadata by means of metadata editors. ReloadEditor (Reusable eLearning Object Authoring

of Delivery) created under the auspices of JISC (The Joint Information Services Committee) within the program X4L is the example of the successfully used editor. Its operation is so simple that even a person inexperienced in programming can acquire enough knowledge quickly to be able to „dress” the self-created educational course in metadata and place in a server.

ReloadEditor is application of Java, therefore it is not ascribed to a specific operation system. It can be installed on both the platform Windows, Linux or MacOS. The only requirement is to install the package Java Runtime Environment (JRE) in the version, at last 1.5.0.4. Starting the Editor there are formed automatically the files including the basic data [6]:

- `imsmanifest.xml` – the manifest of Content package including all stored information,
- `imscp_v1p1.xsd` – the local copy of the content package in the format XML Schema,
- `imsmd_v1p2p2.sd` – the local copy of metadata in the format,
- `ims_xml.xsd` – the local copy of the document XMLSchema.

Editing individual fields, there are introduced the data describing in a detailed way a subject and contents of a course, among others, main information, language, brief description, current version and commercial information (paid for or free, if paid the charge, reductions etc.). Fig. 4. presents the example of editor and edition fields.

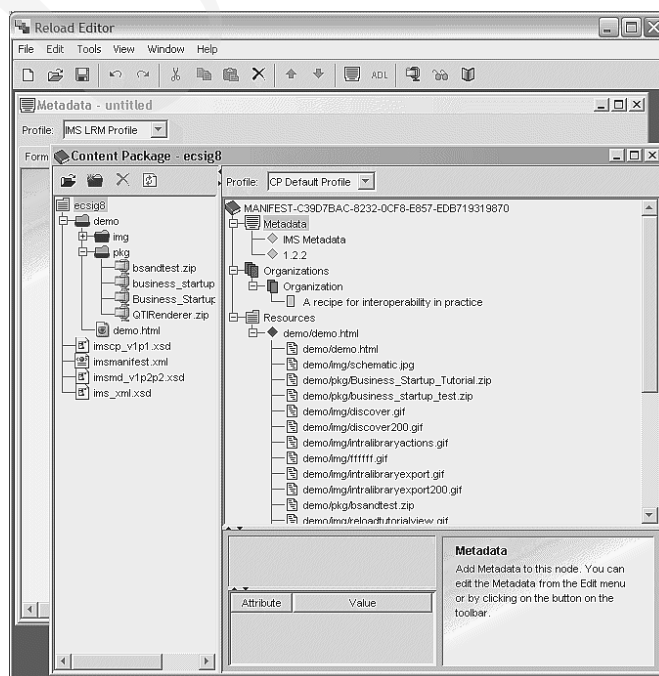


Fig. 4. Edition of metadata using ReloadEditor [6]

### Conclusion

Most information about data can be described by means of metadata and therefore information can become widespread owing to their quicker finding (only the metadata with determined parameters are searched) or rendering them accessible (metadata include information about location of file). Possibilities provided by language questions used in the databases (eg. SBQL) or by modern ways of data exchange eg. In the networks p2p should be exploited. Making use of the above achievements of internet technology, it is possible to create in a short time a professional course with lectures delivered by world famous preparation of a course from the rudiments. Not to take a rose-colored view, one should remember about copyrights in order to have this intellectual value at one's disposal. However, this is not the subject of this article.

### References

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