

# Digital Technology for Presenting Museum Collections

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**Abstract:** Here are discussed problems connected with the digitalization, creation, storage and distribution of digital objects from museum collections. The experience from the research of the funds of the Ethnographic Museum in Plovdiv is shared. The technology that has been used for the creation of an aggregator of collections of digital objects is described. What is analyzed is the necessity of creating a regional aggregator of digital cultural and historical artifacts based on the standard used by Europeana. The developed “Catalogue of cultural and historic objects” is also presented – <http://www.plovdiv-eu.com>.

**Keywords:** digitalization of cultural and historic objects, Europeana, aggregators, metadata standards

## I. Introduction

In 2010 a survey [1] was conducted about the readiness of museum institutions from the region of Plovdiv for digitalization of collections, the use of metadata standards for description of the objects and the possibility for presentation in digital libraries like *Europeana*.

The digital libraries are the modern technological solution of the problem connected with the publishing of valuable cultural artifacts and the ability for semantic access to them. They require effective description of the content by maintaining metadata structured in accordance with the relevant standards.

The objective is the creation of a library of digitalized objects and technological environment for maintenance of museum collections of different kinds in an aggregator that is to be integrated in the European digital library.

The content of that library is expected to be maintained by selected collections from the museums and galleries fund from the region of Plovdiv. This task is in harmony with the idea about the storage of the valuable historical monuments in the European cultural environment and the complete preservation of their identity and specifics.

This report also presents the achieved results from the joint work with museum specialists from the regional Ethnographic Museum in Plovdiv. The information activities that are conducted in it, the available services, the fields of interest of the scientific workers and visitors of the museum are examined.

Certain experience has been accumulated in the application of appropriate standard metadata and the adaptation of specific descriptions to them. The structure of the collections from the museum fund is specified, some positive results are observed in the process of retrieving information from the description of the available in them objects.

## II. Structure of the museum collections in the Ethnographic Museum in Plovdiv

Several archives are preserved in this museum and they describe the exhibits presenting the traditions, everyday life, folklore and other ethnographic specificities of the region. The museum specialists have used basically two approaches to information systematization – *regional* and *thematic*. The *regional* archive describes the place – geographic region, village, neighborhood or town where the information concerning the people’s culture and everyday

life was gathered. The *thematic* archive is structured in accordance with the diversity of the objects from everyday life, craftsmen instruments, clothes, adornments, musical instruments, folklore materials, etc.

The information analysis reveals that both archives involve intersecting sets of objects. This requires a careful expert analysis and a correct description of the metadata about them.

The scientific literature on ethnography and the other studied sources of museology [4][5] do not offer specific definitions about the separate thematic classes from the collection or about their precise differentiation. Researchers from the Ethnographic Museum with an Institute at the Bulgarian Academy of Sciences [7] indicate that these systems require various approaches and models for data description.

The application of information technologies requires a definition of precise and simple structures of the collections and application of rules of the accepted metadata standards [1].

The task of creating digitalized museum objects and their storage in certain libraries is connected with the creation of ontology of the museum collection. There are still certain exhibits in the modern museums that are not classified in the corresponding category or are attached to such a category but with many stipulations. Some descriptions and conclusions often are based on insufficient or even missing information. It is necessary set of diverse objects be classified in respecting of clear and correct rules.

The accumulated experience from the organization of different museum collections shows that the traditional solution is the maintenance of basic **funds** in which the specialized **sectors** with the corresponding **collections** are included. They, on the other hand, consist of **groups** with specific museum **exhibits**.

It is well-known that the modern museums store and service two kinds of collections: physical and digital. The text description of the content on the digital image is considered as metadata connected with this object.

The task requires effective structuring of the collections of objects and maintenance of metadata in accordance with the corresponding standards – in this particular case – those used by Europeana.

### III.Organization of the digital archive

The digital archives of the Ethnographic Museum are described in two comparatively independent from one another ways.

- for each separate fund there is an **Excel file** in which the rows contents information about the objects in the corresponding fields;

- **Passports of the movable cultural valuables** issued in accordance with the state requirements [2] and described in **Word files**. Passports have been issued for about 4000 of the museum exhibits.

The work with these archives requires the analysis of the readiness for creation of metadata in accordance with *Europeana* standards [3]. The research of the “Crafts” fund of the Ethnographic Museum helped us to specify the basic classes and subclasses of elements in the corresponding groups required by the *Europeana* metadata scheme.

“Identification signs” – contains descriptive criteria (typical for the traditional metadata description as well) such as title, archive number, period, place of residence, type, annotation, etc. of the specific object.

“Technical information” – includes information connected with the digitalization of the object.

As an illustration we present part of the xml description in accordance with the requirements of Europeana:

```
<!-- Strongly recommended elements -->
<dc:title> Pitcher </dc:title> <! Title of the object -->
<dcterms:alternative>Earthen Jar </dcterms:alternative> <!-- Alternative „folk” title -->
```

```

<dc:creator>Unknown master from Troyan</dc:creator> <!-- Author of the original. -->
<dc:contributor>Darin Kambov</dc:contributor> <!-- Grantor -->
<dc:date>1860 – 1870 </dc:date> <!-- Date of the creation of the original. -->
<dcterms:created>Revival</dcterms:created>
<dcterms:issued>2007</dcterms:issued><!-- Specifying element of <dc:date> Date of publishing of the digital object or the original -->

```

Further some **additional elements** follow – the examination of the scientific passports of the exhibits reveals a satisfactory amount of information for their retrieve – a description of the original object, physical characteristics, data connected with conservation, digitalization, etc.

#### **IV. Aggregation of metadata and digital libraries**

What lays in the center of the model for digital library is the way the metadata concerning particular collections of objects are structured. In a historical context the process of creation of such structures repeats the efforts and tools already known from the cataloguing systems, the systems for searching and retrieving information in the library systems.

The aggregator for digital collections is a web-based technology [6], offering the numerous different users the possibility not only to publish objects on the Internet but also to create their own models of the data, related to these objects. All the objects with the same data model are combined in a collection.

With the multi-users systems the different kinds of users/institutions usually apply one common data model about the input objects but sometimes it is necessary that the institutions add their own characteristics of the objects.

##### ***Data model of an object. Collections of objects***

A technology has been developed that reflects the specifics when data input. It includes:

- Creation of base standards for object description – an option for defining the type of the characteristics/the fields of the object;
- Hiding the fields from the forms for data input;
- Added with additional specific fields/characteristics from the users;
- Defining names of the models.

The creation of data models ensures additional categorization of the objects and facilitates input of data.

**Collection**, in the sense of the created technology is a set of objects with an equal data model. Using the data modeling mechanism the different institutions with a common system can create a collection of object descriptions based on the existing or their own standards. The main characteristics of the technology are:

- **Multi-users** – users with different roles are organized in a hierarchy that defines rules for access to services. Each consumer can register in the system and change basic data concerning his profile;
- **Multilingual** – the objects can be introduced in one or more languages. Localized files with basic terms and a localized data base is used for the realization of this mechanism;
- **A catalogue of objects** – standard possibilities for object input, editing and deleting are presented as well as for different kinds of searching ( with the help of keywords, categories, dates);
- **Categories of the objects** – standard possibilities for object input, editing and deleting are presented;
- **Collections of objects** – possibilities for data modeling of the objects are realized;

#### **V. A catalogue of the cultural and historical objects**

An experimental work was developed “**A catalogue of the cultural and historical objects**“ (<http://www.plovdiv-eu.com>) to illustrate the approaches for structuring, preparing and processing of data about the digital objects. The problem for automatic input in the data catalogue from the available in the museum archives is also analyzed.

A web portal is realized so as the different institutions (museums, galleries, etc.) as well as the ordinary users to be able to input information concerning the museum objects. The developed technology for an aggregator of the standardized collections of digital objects [3] is used and with its help each user can create his own data models and input information only about the characteristics introduced in this way. The *Europeana* [1] metadata scheme is set as a standard so as the introduced objects to be exportable to the European digital library for cultural and historic heritage <http://www.europeana.eu/>.

The catalogue **www.plovdiv-eu.com** offers its users a convenient navigation (realized through different menus with categories and a path to the current site). A comparison is made with the possibilities for searching in *Europeana* so as relevant improvements to be offered.

For the automatic transfer of data concerning the objects from the collection of the Ethnographic museum the following problems have been examined in the system:

1. Is there compatibility between the fields of *Europeana* and the fields in the scientific passport of the objects?
2. Can the data from the object description be automatically extracted from an Excel file and transferred to database?
3. Can the data from the passport (Word file) be automatically extracted and transferred to database?
4. Optimization of the work with information about one and the same object described in Excel file and in the passport.

The comparison that has been made between the characteristics of the object in accordance with the *Europeana* standards and *the passport of movable cultural valuables* shows compatibility. The correspondence between the identifiers in the two standards are described in the system and are visible in the help information for each field of the input form (Fig.1).

For example: “Title of the object” from *the passport of the movable cultural valuable* object has a corresponding label in *Europeana* – “dc:title”. The different characteristics in the two standards are differentiated in subpages of the form for object description - “Metadata” and “Passport”. In “Metadata” can be found characteristics that are specific for *Europeana* standard and that are rarely used while in the passport what can be found are characteristics specific for the Bulgarian museum exhibits.

The second problem was decided positively. An Excel file can with simple transformations (with word processing functions or by MS Access), be transferred to database table (in this case – MySQL). After the initial transfer of the archive in an additional table, data is distributed in the original object tables.

Over 4500 objects from the “Crafts” fund of the Ethnographic museum are inserted in the catalogue up to now.

The transformation of the passports (Word documents) into a format suitable for automatic processing was more difficult but is not current problem. Their information is contained in Word tables. The names of the characteristics of the object are in specific cells and their values are in others. The Word document can be processed with the help of a specialized tool that works with the model of the objects (Word Object Model). There are other technologies but their usage for processing of a specific file format is rational if a general solution connected with other similar tasks can be realized.

The open character of the system allows the creation of data models for different objects. Fig 2 shows part of the data modeling process for a specific collection of objects. While modeling you can control whether to show or hide all fields for a particular language, whole subpages of the entry form or separate characteristics, you can add new fields (not described in the standards for passport and *Europeana*) and indicate whether they are visible

or not for the other website visitors. Another basic characteristic of the open character of the system is the option the users to create their own categories. The basic categorization of the objects is controlled only by the system administrator. The additional categorization allows the users to group their own objects more exactly. For example – the exhibits of the Regional Ethnographic museum in Plovdiv are distributed in funds/sectors and collections as required in [2]. The sectors in the museum are - “Agriculture”, ‘Crafts”, “Materials and Garments”, “Furniture and Interior”, “Musical Instruments and Ritual Accessories”, “Photo Library and Fine Arts Exhibits”. In the “Crafts” sector there are collections like “Adornments”, “Wrought Iron”, “Cold Steel Weapons”, etc., that the user can create self.

The system is managed in two languages – Bulgarian and English. Each object can be input in these two languages and is shown in the relevant language version of the portal. Unfortunately, a considerable part of the descriptions of the museum exhibits in Bulgaria do not have a translation in English.

**Roles** – Several kinds of users are served in the realized system. Each one of them has a role which usually is selected at the time of the registration of the user and it specifies rights for services usage:

- *Non-registered user* – he can only browse the content of the site – static pages, pages of objects and institutions, he can done different kinds of searching.
- *Registered user/institution* – there are two kinds of registered users – ordinary and institutions. They can create, edit and delete their own categories, collections, objects, web sites (as a sub-domain). The difference is that the institutions can register their own users and activate their own objects while the ordinary users can activate their objects only after a allowed access given by the system administrator. This limitation is conditioned by the requirements for content security.
- *Users-Institution* – each institution can employ assistants for input objects. After a examination the institution activates the objects, inserted by the assistants. Then the objects become unavailable for the employees that have entry data.
- *Administrator* – controls the creation of basic categories and collections for the portal as well as of the objects, created by the ordinary users.

The development of *the catalogue for cultural and historical objects* still continues by creating new additional opportunities for the both kinds of users – museum specialists and the other kinds of visitors with different interests.

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