

Transformed Into Digital Resources - a New Life for the Cultural Heritage Related Research and Scientific Archives

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Abstract. For decades, museum specialists have kept their research on paper - precious invaluable work. Today, this lost knowledge can be made available again. By digitalizing these studies and providing them with open access will offer scope for a deeper study of the Bulgarian cultural heritage, an integral part of which are the works of the investigators, ethnographers, historians, archaeologists. The paper gives a further look into the process of digitalizing old studies related to the cultural heritage initially from the archives of Regional historical museum Burgas. The described model is universal and can be a base for other cultural organizations that would like the ability to open their archives up to third parties, make them easy accessible, easy to maintain and become more sustainable.

Keywords: Digital resources, Digitalization, Science heritage, Cultural heritage

1 Introduction

For many decades museum specialists in Ethnography, History, Natural Science and Archaeology have recorded their field studies and researches on paper. However, many of the archives, publications in periodicals and magazines filled with invaluable works have been lost or became unusable over the years. The cause could be the short life of paper documents and the damage it can suffer. Additionally, there is another natural cause – the transformation of society, the way information is handled and used. The inability to move quickly in to the digital era has become one of the reasons during the past years the Bulgarian museums to gradually lose their prestige as scientific organizations in the eyes of society. Their researches remain locked in the cabinets or can be found only in their own periodicals or collective publications printed for a particular event or person in a very small edition. In fact, studies carried out by museum workers can be extremely valuable because they are generated firsthand – stepping on fieldwork records or work with objects of the tangible cultural heritage from the museum collection, the access to which is highly restricted. This limitation leads to very little popularity and impact of the research as well as a loss of important data from primary sources

that are not used as a springboard for further, extensive research due to their inaccessibility.

However, the advantage that the era of electronic information offers can be a possibility this lost knowledge to be made available and popular once again. By digitalization of the museum publications, firsthand archives, periodicals and magazines, a chance is given for a deeper and more comprehensive study of the Bulgarian cultural heritage, an integral part of which are the works of its investigators - ethnographers, historians and archaeologists.

Registering the content on web platforms following the principals of open access data, as well as setting common standards to facilitate the search for information, will be the next challenge for the followers of the idea for public digital repositories with cultural heritage data.

2 Investigation

In regard, this paper suggests a universal method for the digitalization of works from former and current specialists of all departments in a museum that initially will be implemented in the Regional historical museum of Burgas. The Museum's scientific archives will include manuscripts, works written on a typewriter, articles published in old periodicals, newspapers, magazines, etc. They will be digitalized in original and in text to ease the search process, stored as digital resources in pdf format and catalogued. A special system - a digital repository for articles, will be added to the existing system of RHM Burgas (RHM-Burgas, 2019) with web front end. The digitalized works with introduced metadata, categorization, and keywords by author, title, subject, category, and some of the materials will be offered with open access to full content depending on copyright requirements. Subsequently, the article repository could also be linked to the current system for the digitalization of tangible objects from the Museum collection to link them with the related research and archives of the museum specialists.

The software used by RHM Burgas for digitalizing of objects from its collection is called MusLib. (Stewart, *Aquae Calidae MusLib - to connect 20 centuries of history*, 2018) It is custom built for the work of the museum specialists as it is based on previous experience with the digital library of Regional historical museum Yambol (RHM Yambol) (Stewart, *Problems of storage and preservation of museum valubles - digital repositories*, 2016) and the multimedia digital library "Virtual encyclopaedia of the Bulgarian iconography" (BIDL) (IMI BAS, 2019) created by Institute for Mathematics and Informatics of the Bulgarian Academy of Science (IMI BAS). The task of MusLib was the development and implementation of a base standard ontology that can covers all types of objects and serve as a template for museum digital libraries following the Bulgarian national legislation in order to communicate easy through digital means, exchange or share.

In addition, one of the requirements for MusLib was to be universal and easy to manage and extend through inbuilt functionalities, which means it can be used for extending the digital library to cover also scientific heritage such as archives, papers, publications from magazines, proceedings, books etc.

2.1 Structure

The developed ontology for MusLib follows closely the structure of the mandatory paper inventory books used in the Bulgarian museums for the entering of objects classified as cultural valuables. As mentioned above MusLib offers the ability to add any other required fields or adapt to changes yet stay unified.

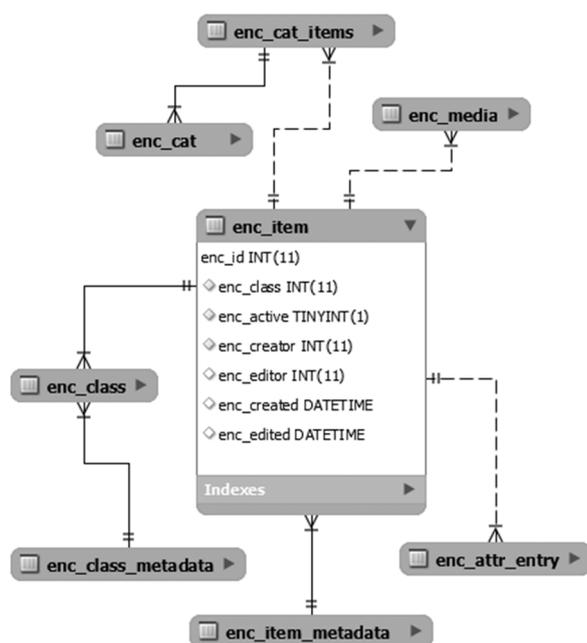


Fig. 1. Structure of the classes / basic ontology in MusLib

However to add the support for entering scientific heritage to database it will require the implementation of another ontology, which is very different from the current one for objects. For the digitalization of the archives the Dublin Core metric standard (DCMI) (Dublin Core Metadata Initiative, 2019) will be used, which is the most common bibliographic standard used by many European and Bulgarian cultural institutes. The original DCMES Version 1.1 consists of 15 metadata elements. This well-structured set of fields can be used to describe the most important attributes for scientific heritage. In Bulgaria DCMI is standardized according to BDS - ISO 15836: 2010. (Zhelev, 2018)

MusLib offers the functionality to add limitless additional ontologies using the classification subsystem.

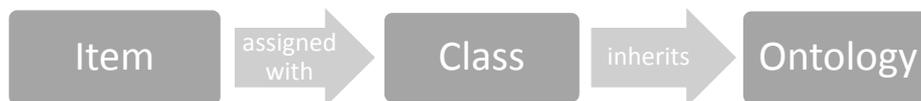


Fig. 2. Main relation statements in the model.

This model of data storage allows great flexibility to add more than one ontology dynamically in the same environment. Inside it any item can be interlinked together from any class, inherit any category or be related through the use of tags. This allows easier detection and creation of new, more complex systems. The extensibility of the model and the opportunities it creates for swift adaptation of the system in case of introduction of new standards or the need for a change of the taxonomy due to the new needs of the digital library users, is one of its strongest advantages and presents innovation in the field.

2.2 Metadata

Using a metadata format referred to as *metaformat* (Zheleva & Pavlov, 2003), which is entered in to the classes, the system can procedurally generate metadata output by formatting the attribute fields according to the *metaformat*. This allows it to follow any given standard.

Metadata sample for Dublin Core using the metaformat "DC-%s":

```

<meta name="DC.Language" content="en" />
<meta name="DC.Publisher" content="publisher-name" />
<meta name="DC.Title" content="HYP" />
  
```

Metadata sample for MusLib basic ontology using the metaformat "ML-%s":

```

<meta name="ML-Title" content="Gold coin" />
<meta name="ML-Dating" content="685-695 AD" />
<meta name="ML-Ruler" content="Justinian II" />
  
```

2.3 Ontology Structures

The basic ontology of MusLib that is developed for the needs of the Bulgarian museums and the entering of cultural valuables, uses the following structure:

```

enc_item {Object}
enc_attr {Attributes} -> enc_attr_entry
enc_attr_group {Classes / Groups}
  
```

```

enc_attr_group_metadata {Registration}
enc_attr_metadata -> enc_attr_entry_metadata
enc_attr_metadata {Field inventory number}
enc_attr_metadata {Expert statement number}
enc_attr_metadata {Reg.n. of the movable cultural asset}
enc_attr_metadata {Inventory number}
enc_attr_metadata {Document number}
enc_attr_metadata {Book Date and Time}
enc_attr_metadata {Old inventory number}
enc_attr_group_metadata {Description}
enc_attr_metadata {Count}
enc_attr_metadata {Weight}
enc_attr_metadata {Type of object}
enc_attr_metadata {Dimensions}
enc_attr_metadata {Material}
enc_attr_metadata {Condition}
enc_attr_metadata {Dating}
enc_attr_metadata {Ruler}
enc_attr_metadata {Country}
enc_attr_metadata {City}
enc_attr_metadata {Site}
enc_attr_metadata {Location found}
enc_attr_group_metadata {Bounding box}
enc_attr_metadata {Width (mm)}
enc_attr_metadata {Height (mm)}
enc_attr_metadata {Depth (mm)}
enc_attr_group_metadata {Donor}
enc_attr_metadata {Donor name}
enc_attr_metadata {Donor's address}
enc_attr_metadata {Protocol number}
enc_attr_metadata {Date of the protocol}
enc_attr_group_metadata{Storage and restoration}
enc_attr_metadata {Place of storage}
enc_attr_metadata {Notes restoration}
enc_attr_metadata {Additional Information # 2}
enc_attr_group_metadata {Additional}
enc_attr_metadata {Value (BGN)}
enc_attr_metadata {Inscription (s)}
enc_attr_metadata {Additional Information # 1}

```

The ontology based on DCMES (DCMI, 2014) that will be included in MusLib for entering of the digitalized scientific heritage such as papers, archives, publications etc.:

```

enc_item {Object}
enc_attr_metadata -> enc_attr_entry_metadata

```

```
enc_attr_metadata {Contributor}
enc_attr_metadata {Coverage}
enc_attr_metadata {Creator}
enc_attr_metadata {Date}
enc_attr_metadata {Description}
enc_attr_metadata {Format}
enc_attr_metadata {Identifier}
enc_attr_metadata {Language}
enc_attr_metadata {Publisher}
enc_attr_metadata {Relation}
enc_attr_metadata {Rights}
enc_attr_metadata {Source}
enc_attr_metadata {Subject}
enc_attr_metadata {Title}
enc_attr_metadata {Type}
```

3 Conclusions

The aim is to explore the potential of digital space and technologies to improve access to cultural heritage research and knowledge of specific cultural valuables preserved in museum collection. In this way, a better understanding of the heritage and its transmission for generations is stimulated. By providing open access to the work of investigators - ethnographers, historians, culture scientists, archaeologists - fewer known themes will be popularized. By accessing resources digitally, it will facilitate the exchange of experience and knowledge, combining a scientific and practical approach in a unified form and space. It will significantly improve work on the digitization of museum archives, both in the quality of digital resources and online content representing the cultural heritage.

With the initial start of the digital library for its icon collection and the software for digital repository MusLib, RHM Burgas became the first museum in Bulgaria to open its collection online on the terms of open data (Alexiev, 2018), containing not only images but also a complete data structure. In 2016 RHM-Burgas became also a whistleblower in the Bulgarian museum field for the online publication of the full editions of museum proceedings and its example was followed by some of the large museums in the country. As described above the next step requires serious work and determination to engineer a system that links closely the digitized resources, making them highly sustainable, durable and usable in user-friendly environment. Proven from previous experience, public digital resources are of a long-term benefit to museum specialists and scientists across the country, creating a sustainable accumulation of knowledge and practise. The publishing of more extensive online resources provokes a lasting interest and is a good way to promote the museum's activity and attract new audiences.

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