METADATA ELEMENTS FOR CULTURAL OBJECTS: A COMPARATIVE STUDY OF METADATA SCHEMAS

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ABSTRACT
This article discusses metadata schemas in the cultural heritage domain. Metadata elements of schemas are briefly described. Comparisons of elements of different metadata schemas under cultural heritage domain have been analyzed. Finally, an outline of metadata standard is devised for cultural objects. Elements those are not in any schemas but required for better description and understanding have also to be included.

Keywords: *Metadata Standards, Cultural Heritage, Cultural Objects, Metadata.*

1 Introduction:
Cultural Heritage is cultural asset of a nation. These assets such as monuments, groups of buildings, numismatics, temple, useful arts, arms and armor etc undergo continuous changes due to adaptations, renovations, disasters, decay, maintenance etc and it affects the status of these heritage Assets. Heritage information is required to understand meaning and values, promote the interest and involvement of people, ensure long term maintenance and conservation. To transmit acquired knowledge generation to generation, Heritage Information is to be recorded, documented and maintained in proper way.

To make documentation and retrieval of Cultural Objects (i.e. works of art, architecture and other creative endeavor) uniform, many Institutions have been working for developing standards.

Metadata is a glue that makes information useful. It is data about data and it describes characteristics of a resource. A metadata standard consists of a set of metadata elements design for a specific purpose. As one size does not fit all, even one size does not fit many, so different metadata standards are being developed in variety of subject domain. This paper aims discuss and compare metadata schemas in the Cultural Heritage domain.

2 Metadata Schemas Under Study:
There are many data standards and harvesting schemas in the cultural heritage domain. Following

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schemas have been considered for studies.

i. VRA Core
ii. EDM
iii. LIDO
iv. MIDAS
v. CARARE
vi. CIDOC CRM
vii. CDWA
viii. UK GEMINI
ix. DC
x. MODS

Among above 10 schemas, Dublin Core and MODS are general purpose standard.UK GEMINI is geospatial metadata service.

2.1 VRA Core:

VRA Core is a data standard that consists of a metadata element set as well as an initial blueprint for how those elements can be hierarchically structured. The element set provide a categorical organization for the description of work of visual culture as well as the images that document then. ARA Core is developed and maintain by the VRA Core oversight committee.

2.2 EDM :

EDM is designed to provide an integration medium for collecting, connecting and enriching the descriptions provided by Europeana content providers. It is a major improvement on the Europeana Semantic Elements, the basic data model that Europeana began life with. Each of the different heritage sectors represented in Europeana uses different data standards, and Ese reduced these to the lowest common denominator. EDM reverses this reductive approach and is an attempt to transcend the respective information perspectives of the sectors that are represented in Europeana – the museums, archives, audiovisual collections and libraries. EDM is not built on any particular community standard but rather adopts an open, cross domain, semantic web based framework that can accommodated the range and richness of particular community standards such as LIDO for museums.

2.3 LIDO :

LIDO is the recent of the collaborative effort of international stakeholders in the museum sector, to create a common solution for contributing cultural heritage content to portals and other repositories of aggregated resources. LIDO can be used for delivering metadata, for use in verify of online services, from an organizations online collection database to portals of aggregated resources as well as exposing, sharing and connecting data on the web. In addition it intended to represent the full range of descriptive information about museum objects e.g. art, cultural, technology and natural science while it supports multilingual environments.

LIDO only requires four mandatory elements e.g. objects type, Record ID, Record Source, Title and in that way the data providers can decided on how light-or how rich-they want their contributed metadata records to be, while also allowing for delivering data and resources relating to their objects. LIDO structure is divided in the descriptive and administrative information groups. Descriptive information group includes metadata about the cultural objects, administrative

information group includes administrative metadata.

2.4 MIDAS Heritage Standards:

MIDAS heritage is data standard for information about the historic environment, which was developed and maintained by English heritage for and on behalf of the UK Forum on Information Standards in Heritage(FISH). MIDAS Heritage covers the three main themes:

· Heritage assets- Building, Monuments, Artifacts, Ecofacts etc
· Activities- Field investigation, research and analysis etc.
· Information Source- Bibliographic Source, archive materials etc.

2.5 The CARARE Schema :

CARARE Schema is a metadata schema based on existing standard from the archeology and architecture domain. It is a harvesting schema intended for delivering metadata to the CARARE service environment of organizations online collections, monument inventory database and digital objects. It does not support activities such as monument management and protection. The strength of the schema lies with its ability to support the full range of descriptive information about monument, buildings, landscape areas and their representations.

The root element of a CARARE record is CARARE Wrap- the CARARE schema wrap, it wraps one or many CARARE records. The four major concepts, which are wrapped into a main entity-the CARARE record, are

· Heritage Asset-holds the metadata for a monument, including descriptive and administrative metadata. Heritage assets are "first class" citizens in the CARARE schema.
· Digital Resources- holds the metadata about the digital resource.
· Collection Information- hold the collection level description.
· Activity-holds the metadata on even or activity.

2.6 CIDOC CRM:

The CIDOC CRM is a formal ontology and an ISO that defines cultural heritage documentation concepts and the relationship between them, used to clarify the documentation process, and to ensure and to ensure no loss of semantic content when integrating hetero-genius cultural heritage data source. CIDOC CRM is intended to promote a shared understanding of cultural heritage information by providing a common and extensible semantic framework to which any cultural heritage information can be mapped. More specifically, the CIDOC CRM is a formal standard that defines documentation concepts for the cultural heritage and the relationship between those concepts. Its provides a flexible standard framework that cultural heritage data can mapped and provides a framework for semantic interoperability.

2.7 CDWA :

CDWA has been developed and maintained by the GETTY. The CDWA described the content of art database by articulating a conceptual framework for describing and accessing the information about work of art, architecture, other material culture groups and collections of work and related images. The CDWA includes 381 categories subcategories. A small subset of categories are considered core in that they represent the minimum information necessary to identify and describe a work.

2.8 UK GEMINI :
UK GEMIONI was designed for use in the UK geospatial metadata service gateway to replace the National Geospatial data framework, metadata standard that is compatible with ISO 19115. Geospatial data is data containing a locational element relative to the earth. UK GEMINI provides a core set of metadata elements for use in a UK geospatial metadata service.

2.9 DC :
The Dublin core metadata elements set was proposed as a minimum number of metadata elements required to facilitate the creation of simple descriptive record for electronic documents. The set consist of a flat list of fifteen elements describing common properties of resources. To promote global interoperability, a number of the element description may be associated with a controlled vocabulary for the respective elements values. Dublin core metadata may be used for multiple purpose, from simple resources description to combining metadata vocabularies of different metadata standards. The Dublin core standard originally includes two levels simple Dublin core that comprised 15 elements and qualified Dublin core that included 3 additional elements, as well as a group of elements retirement that could defines that semantic of the elements in ways that may be use-full in resource discovering.

2.10 MODS:
The MODS is a general purpose schema that may be used for a variety of purpose. It includes subject of MARC fields. It uses language based tags rather than numeric once. The MODS record has been designed to carry key data elements from the MARC records. High compatibility with existing resource and description, less detail than MARC, item description from outside in DC and other simpler formats can be mapped etc. and the advantage of using MODS.

3 Comparative Study of the Existing Metadata Schemas :
All the data about different metadata schemas under different characteristics are arranged in the table-1.

Table-1: Data About the Schemas

SL.NO	ELEMENT	VRA Core	EDM	DC	LIDO	MIDAS	UK GEMINI	CARARE	CIDOC CRM	CDWA	MODS	% of Occurrence
1	Work, Collection, ID	Yes	Yes	Yes	Yes	X	Yes	Yes	X	Yes	Yes	80
2	Title	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100
3	Agent /Creator, Actor	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100
4	Cultural Content	Yes	X	X	Yes	X	X	X	X	Yes	Yes	40
5	Period/Date /Time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100
6	Inscription	Yes	X	X	Yes	Yes	X	X	Yes	Yes	X	50
7	Location / Geographic	Yes	Yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100
8	Material	Yes	X	X	X	Yes	X	X	Yes	X	X	30
9	Method /Technique	Yes	X	X	X	Yes	X	Yes	X	Yes	X	40
10	Source	Yes	X	Yes	Yes	Yes	Yes	Yes	X	X	X	60
11	Subject	Yes	Yes	Yes	X	X	X	Yes	X	Yes	Yes	60
12	Description	Yes	Yes	Yes	Yes	X	Yes	X	Yes	Yes	Yes	80
13	Right	Yes	X	Yes	Yes	X	Yes	Yes	Yes	X	X	60
14	Type	Yes	Yes	yes	Yes	Yes	Yes	Yes	X	X	Yes	80
15	Format	X	Yes	Yes	X	X	X	X	X	X	Yes	30
16	Relation	Yes	Yes	Yes	Yes	X	X	Yes	X	X	X	50
17	Publisher	X	Yes	Yes	X	X	X	X	X	X	X	20
18	Language	X	Yes	Yes	X	X	Yes	Yes	X	X	Yes	50
19	Contributors	X	X	Yes	X	X	X	X	X	X	X	10

SL.NO	ELEMENT	VRA Core	EDM	DC	LIDO	MIDAS	UK GEMINI	CARARE	CIDOC CRM	CDWA	MODS	% of Occurrence
19	Contributors	X	X	Yes	X	X	X	X	X	X	X	10
20	Measurement	Yes	X	X	Yes	X	Yes	X	Yes	Yes	X	50
21	Style Period	Yes	X	X	X	X	X	X	X	Yes	X	20
22	Edition	X	X	X	Yes	X	X	X	X	Yes	X	20
23	Abstract	X	X	X	X	X	Yes	X	X	X	Yes	20
24	Topic Category	X	X	X	X	X	Yes	X	X	X	X	10
25	Appellation	X	X	X	X	X	X	Yes	Yes	X	X	20
26	Keyword	X	X	X	X	X	Yes	Yes	X	X	X	20
27	Design	X	X	X	X	X	X	X	Yes	X	X	10
28	Curation Activity	X	X	X	X	X	X	X	Yes	Yes	X	20
29	Target Audience	X	X	X	X	X	X	X	X	X	Yes	10

3.1 Common Elements (100%)

Following elements are common to all standards under study i.e. 100%

I. Title
ii. Agent/ Creator/ Actor
iii. Period/ Date/ Time
iv. Place/ Location/ Geographic Information

3.2 Common Elements (50%)

List of Elements which are common to at least 50% standards under study

v. Work, collection, ID
vi. Inscription
vii. Source
viii. Subject
ix. Description
x. Right
xi. Type
xii. Relation
xiii. Language
xiv. Measurement

3.3 Common Elements (20% to 40%)

List of elements which are common to 20% to 40% standards under study

xv. Cultural context
xvi. Material
xvii. Method/ Technique
xviii. Format
xix. Publisher
xx. Style Period
xxi. Edition
xxii. Abstract
xxiii. Appellation
xxiv. Keywords
xxv. Curation Activity

3.4 Common Elements (10%)

List of elements which are common to only one (10%) standards under study

xxvi. Contributors
xxvii. Topic Category
xxviii. Design
xxix. Target Audience

4 Conclusion:

From the above study it is clear that metadata elements differ from standard to standard. To describe and retrieve heritage information, following metadata elements may be included

i. **Purpose** – What was the purpose of creation of the work of art – Aesthetic; Economic; Political; Religious; Social or other? The answer should be recorded for better understanding.
ii. **Present Status** – What is the present status of the Heritage Item? i.e. Heritage Item declared by any organization/ statutory body such as UNESCO; Govt of India; Govt of West Bengal; any Other body. This should be recorded for better understanding.
iii. **Physical Description** – In case of physical description following sub-elements may be included
    a. Total Area
    b. Occupied Area
    c. Type
    d. Base
    e. Measurement – height; length; width; diameter; thickness; circumference;
iv. **Features** – Incase of features following sub-elements may be included
    a. Material used
    b. Method followed
    c. Style
    d. Theme
    e. Facing
    f. turret (with brief description)
v. **Brief Description** – A place for free text note. Here information which could not be recorded in above elements may be written.

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