

Deliverable

Audit Report on MELT content - version 2 3rd part: MELT Application Profile

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Abstract:

This document presents the Metadata Application Profile to be used in the MELT project

Keyword List:

Metadata, vocabularies, profile

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1 MELT METADATA

Starting with the existing EUN LRE application profile (version 2.1 - developed during and after the CELEBRATE project), the metadata subgroup (MDG) made a number of recommendations for how this LOM-based profile needed to be amended in order to meet the requirements of MELT repositories. These changes have now been completely agreed by all content partners. The main changes to the original EUN LRE profile are:

The main changes to the LRE profile (version 2.1) are:

- 1.7 General.Structure becomes Recommended
- 2.3 Life cycle.Contribute becomes Recommended
- 3.2.1 Role becomes Optional
- 3.2.3 Date becomes Optional
- 4. Technical becomes Mandatory
- 4.1 Technical.Location v Mandatory
- 5. Educational becomes Recommended
- 6. Rights becomes Mandatory
- 6.1 Rights.cost takes the single value 'no'
- 6.2 Rights.copyright takes the single value 'yes'
- 9 Classification becomes Mandatory with at least one instance with 9.1 'discipline'
- 9.2 Taxon Path becomes Mandatory holding values of the LRE Thesaurus
- 9.2.2 Taxon becomes Mandatory
- 9.2.2.1 Id becomes Mandatory
- 9.2.2.2 Entry becomes Mandatory
- 9.3 Description becomes Optional
- 9.4. Keyword becomes Optional

The controlled vocabularies used by the partners have also been compared with those in the LRE application profile. An agreement between partners concerning all MELT LRE vocabularies has now been reached and these vocabularies are presented in section 1.4 of this document. These vocabularies are still subject to minor changes over time.

As such the presented MELT application profile, while based on the LRE AP –version 2.1, forms the basis for the LRE AP – version 3.

In this section, the usage of key elements of the full element set and vocabularies of the MELT Metadata Set is described. One of the considerations taken into account is to be backward compatible such that any repository following any previous version of LRE profiles will be able to join the MELT network.

As in LRE profile, two types of element subsets have been maintained: the elements that should be filled in every metadata instance (mandatory elements) and the elements that would be very useful to be filled (recommended elements). Technically speaking the recommended elements are optional (i.e. not mandatory) but there is a practice guideline to fill it in.

The purpose of the MELT Metadata Application Profile is to support the exchange of information about all types of online digital learning resources and assets between partners in the MELT project, and, by extension, within the planned EUN Learning Resource Exchange. The metadata scheme includes a mix of data intended for human and machine readability. Hence all metadata is not designed in a form intended to be seen by the end users directly but will rather be interpreted by the user interface of a metadata editor or a search form in a more user friendly form. For example, language of Learning Object (LO) is described by a two-character language code but it is intended to be exposed to the user by a natural language word of his/her own choice.

NOTE: The term Learning Object (LO) is chosen in this document generally for every type of learning resource (assets, courses, lesson plans, templates, etc) as this document should be read in the context of establishing an application profile for the LOM.

The metadata described in this application profile supports a variety of LO uses including:

- Management
- Searching and finding
- Technical interoperability

and description of properties of individual LOs including:

- Educational attributes
- Digital rights
- Technical features

The MELT application profile is compatible with the LRE Application Profile which in turn is compatible with the IEEE Learning Object Metadata standard (LOM) in order to support interoperability with other metadata schemes. The information model for the MELT metadata (see section 3) is similar to that of the LOM where metadata for a described LO is stored in a metadata element and actual content of an element is called a value. Values can be entered as free text, inserted in predefined format or they are selected from set lists, which are called vocabularies.

The full element set listed in Section 3 establishes the information model for the MELT metadata. The information model groups metadata elements into nine categories: General, Life Cycle, Meta-Metadata, Technical, Educational, Rights, Relation, Annotation and Classification. There are 85 elements in the MELT information model of which 21 do not contain values but function as container elements that group value elements together. Not all elements in the information model are seen as required for MELT metadata but they are there for compatibility with EUN LRE metadata and, by extension, with LOM and as optional elements they cause minimal disadvantage.

Numbers in front of every metadata element are only for referencing purposes. They do not represent any order and are the same as in the LOM information model.

1.1 General Considerations

These general considerations are rather technical; non-technical readers should read on from paragraph 1.2 Mandatory Elements.

1.1.1 Identifying Learning Objects and their Locations

The MELT network has been developed as a means to exchange digitally stored learning resources that might reside in different repositories around Europe (and the globe), with other repositories and services using learning resources. This network can also include repositories that are attached to different learning management systems, learning content management systems, portals and other systems using or producing LOs. In the MELT network all LOs are available for free and Technical. Location – 4.3 is used to indicate the location(s) of a free LO (usually one or more URLs).

The MELT network, as an evolution path to the Learning Resource Exchange (LRE), is developed as a means to exchange digitally stored learning resources that might reside in different repositories around Europe (and the globe) including repositories of learning content management systems, with other repositories and services using learning resources including learning management systems, portals, and other systems using or producing learning resources. In the MELT network the resources are available for free and Technical. Location – 4.3 is used to indicate the location(s) of a free resource (usually one or more URLs)

1.1.1.1 General.Identifier – 1.1

This element is composed of 2 sub-elements: ‘1.1.1 Catalog’ and ‘1.1.2 Entry’. The catalog should be a globally unique identifier, whereas the entry is a resource identifier that uniquely identifies the resource within this named catalog. A learning object can be identified by several elements general.identifier. Typically the catalog could take values such as ‘ISBN’ or any other scheme that is globally unique.

In the context of both the MELT (catalog ‘melt’) and LRE (catalog ‘lre’), each learning resource is identified by the concatenation of:

- The identifier of the repository in which the resource is stored;
- A colon (:); and
- The identifier of the resource in the identifier.

Note that a resource can have more than one MELT or LRE identifier.

	1.1.1	1.1.2
value	<catalog>	<resourceId>
example	isbn melt lre lre	0-451-15167-4 ch:3215 demoportal:112792 sulinet:obj-4235

1.1.1.2 Technical.Location – 4.3

This element is mandatory. It consists of a URL pointing directly to the resource (or eventually to a page describing how to get the resource when the access to it is restricted in some way).

Nr	Value	Example
4.3	<url>	http://w3.cnice.mec.es/recursos/bachillerato/matematicas/probabilidad/index.html

1.1.2 Language

To specify a language such as in data element ‘1.3 General.Language’ or in any language string, the following coding scheme is used. The first applicable format should be used.

1. use a 2 letter code from ISO 639-1
2. use a 3 letter code from ISO 639-2. See: <http://www.loc.gov/standards/iso639-2/normtext.html> (it does not matter between bibliographic & terminology since they only differ for languages that have 2-letter codes)
3. add the ISO Country code (ISO 3166) when necessary, separated by a dash.
4. use IANA registered language tags, prefixed with i-
5. use SIL Ethnologue 3-letter codes, prefixed with x-E-
6. make up a name for token languages prefixed with x-t-
7. make up a name, prefixed with x- for user defined languages

All the above are acceptable but MELT partners should at least implement 1, 3.

nl	Dutch
aus	Australian Languages
i-klíngon	IANA registered Klingon
x-E-pcd	Picard
x-t-cc	Creative Commons License Language
x-t-lre	The LRE Token Language
x-none	Not possible to identify a language

1.1.3 Data Types

There are five data types in the LOM information model and they are:

CharacterString: text can be entered in the element directly.

LangString: the text must identify its language and there can be one or more character strings in the element.

DateTime: the element contains date and time information and there can also be textual information about this point in time.

Duration: the element contains information about an interval in time and there can also be textual information about the duration.

VocabularyTerm: the element contains source and value where source is a reference to publicly sourced and maintained value set and value is a value from that set.

1.2 Mandatory Elements

Five elements of the MELT metadata full element set have been defined as mandatory '1. General', '3. Meta-Metadata', '4. Technical', '6. Rights', '9. Classification'. Mandatory elements should be filled in every metadata instance that is exposed to the MELT network. The eight sub-elements which are mandatory are: '1.1 General.Identifier', '1.3 General.Language', '3.2 Contribute', '4.3 Technical.Location', '6.1 Cost', '6.2 Copyright and Other Restrictions', '9.1 Purpose' and '9.2 Taxon Path'.

1.2.1 General.Identifier - 1.1

'1.1 General.Identifier' is intended to give the LO a unique label in order to identify the LO and its origin.

The LRE value space for '1.1 General.Identifier' element is described in detail in paragraph 1.1.1 Identifying Learning Objects and their Locations.

It is possible to have more than one '1.1 General'. This element refers explicitly to the LO being described by the metadata record. It does not refer to the metadata record itself. To supply an identifier for the metadata record, refer to the '3.1 Meta-Metadata.Identifier' element.

NOTE: This element is for administrative purposes only and should not be exposed to common users.

1.2.2 General.Language - 1.3

'1.3 General.Language' is intended to identify languages used within the LO.

Value space for '1.3 General.Language' element is described in detail in paragraph 1.1.2 Language and there can be up to ten language elements.

NOTE: In ‘1.3 General.Language’ element “x-none” is an acceptable value unlike in other language metadata elements. “x-none” is an actual value stored with the element but it is mapped to an appropriate language word in user interfaces.

Every language used to communicate with a user in a LO should be described. Languages are not exposed to users as codes and tokens used by machines but in human readable form. The applications, e.g. search engines and metadata tagging tools, are mapping codes to words which are then shown to users by their respective user interfaces. Value “x-none” should be used when it is not possible to identify any language for a LO (e.g. the picture of a flower).

1.2.3 Contribute – 3.2

‘3.2 Meta-Metadata’ is intended to describe who has contributed to the metadata instance.

The ‘3.3 Meta-Metadata.Contribute’ is a container element. Information Model (Section 3) permits up to ten ‘3.3 Meta-Metadata.Contribute’ elements.

NOTE: This element concerns the contributors of the metadata instance. ‘2.3 Life Cycle.Contribute’ concerns the contributors of the LO.

1.2.4 Technical.Location - 4.3

‘4.3 Technical.Location’ is intended to provide information where the LO is physically located.

The data type of ‘4.3 Technical.Location’ is `CharacterString`. LRE value space for ‘4.3 Technical.Location’ element is described in detail in paragraph 1.1.1 Identifying Learning Objects and their Locations. If there are multiple values the first one should be the one that is most preferred.

NOTE: To avoid manual input, values for this element should be captured from or supplied by an electronic system whenever possible.

1.2.5 Rights.Cost - 6.1

‘6.1 Rights.Cost’ is intended to indicate if the use of the LO requires any payment.

The value space for ‘6.1 Rights.Cost’ element is a LOM Vocabulary. The information Model (Section 3) permits only one ‘6.2 Rights.Cost’ element.

Since in MELT there should be at least a creative commons license defined, the value should be always ‘no’

1.2.6 Rights.Copyright and Other Restrictions - 6.2

‘6.2 Rights.Copyright and Other Restrictions’ is intended to indicate if any copyright or other restrictions apply to the LO.

The value space for ‘6.2 Rights.Copyright and Other Restrictions’ element is a LOM Vocabulary. Information Model (Section 3) permits only one ‘6.2 Rights.Copyright and Other Restrictions’ element.

Since in MELT there should be at least a creative commons license defined, the value should be always ‘yes’

NOTE: Copyright and/or other restrictions apply to a LO.

1.2.7 Rights.Description - 6.3

‘6.3 Rights.Description’ is intended to provide a textual description of copyrights or other restrictions that apply to the LO.

‘6.3 Rights.Description’ is a LangString (see paragraph 1.1.3 Data Types) element which provide a possibility to define the used language. Information Model (Section 3) limits the number of ‘6.3 Rights.Description’ elements to one but data type LangString permits multiple values (10).

There can be multiple values in ‘6.3 Rights.Description’ element but they must be each in a different language. It is possible to give different description of copyrights and other restrictions in every language but this approach could lead to misunderstanding so it is not encouraged.

1.2.8 Classification – 9

At least one classification (element 9) with element ‘9.1 Purpose’ that equals ‘Discipline’ is mandatory. When ‘9.1 Purpose’ equals ‘Discipline’ ‘9.2 Taxon Path’ element is used to store keywords from the LRE Thesaurus. The LRE Thesaurus terms identifier is stored in element 9.2.2.1 and the term itself can be stored in 9.2.2.2.

1.3 Recommended Elements

Fourteen elements of the LRE metadata full element set have been defined as recommended. Recommended elements are those that would be very useful to have filled in for every metadata instance that is exchanged within the LRE but they could be left unfilled.

1.3.1 General.Title - 1.2

‘1.2 General.Title’ is intended to give the LO a human readable name.

‘1.2 General.Title’ is a LangString (see paragraph 1.1.3 Data Types) element which provides a possibility to define the used language. Information Model (Section 3) limits the number of ‘1.2 General.Title’ elements to one but data type LangString permits multiple values (10).

There can be multiple values in ‘1.2 General.Title’ element but they must be each in a different language and semantically equivalent.

1.3.2 General.Description - 1.4

‘1.4 General.Description’ is intended to provide summarizing description of the LO.

‘1.4 General.Description’ is a LangString (see paragraph 1.1.3 Data Types) element which gives a possibility to define the used language. Information Model (Section 3) permits ten different ‘1.4 General.Description’ elements and data type LangString ten different languages for each individual element. Each description can be up to 2000 character long.

There should not be more than one description per language.

1.3.3 General.Keyword - 1.5

‘1.5 General.Keyword’ is intended to provide free text keywords describing the LO’s content.

NOTE: Recommended element ‘9.2 Taxon Path’ is to be used in place of ‘1.5 General.Keyword’ when values are derived from LRE Thesaurus (see paragraph 1.2.8 Classification).

‘1.5 General.Keyword’ is a LangString (see paragraph 1.1.3 Data Types) element which provides a possibility to define the used language. Information Model (Section 3) permits ten different ‘1.5 General. Keyword’ elements and data type LangString permits ten different languages for each individual element.

The tagging user interface should be designed so that it provides the possibility of entering individual keywords in different languages in one element.

The most specific terms descriptive of the LO's content should be used. Each term or phrase should use a separate keyword element and lengthy phrases should be avoided.

1.3.4 General. Structure - 1.7

‘1.7 General.Structure’ is intended to provide information about the structure of the LO.

The value space for ‘1.7 General.Structure’ element is a LOM Vocabulary. Information Model (Section 3) permits only one ‘1.7 General.Structure’ element.

Vocabulary values:

atomic

A LO that is indivisible (in this context).

NOTE: The term LO is used in this document generally for every type of learning resource (assets, courses, lesson plans, templates, etc).

Assets such as individual picture, sound etc. files are considered always ‘Atomic’.

collection

A set of LOs with no specified (navigational) relationship between them.

An HTML page containing assorted picture files can be considered ‘Collection’ type LO.

networked

A set of LOs that are linked together with no clearly defineable path.

NOTE: Because only one value is permitted to this element, LOs containing multiple features from this vocabulary should be defined as ‘Networked’.

hierarchical

A set of LOs that are linked together with tree structure path.

linear

A set of LOs that are linked together with a clearly defined single sequence path.

NOTE: only one value from the vocabulary is permitted.

Using this element with other elements (e.g. 4.1 Technical.Format and 5.2 Educational.Learning Resource Type), it is possible to describe LOs in even greater detail.

1.3.5 Life Cycle.Contribute – 2.3

‘2.3 Life Cycle.Contribute’ is intended to describe who has contributed to the LO.

The ‘2.3 Life Cycle.Contribute’ is a container element. Information Model (Section 3) permits up to 30 ‘2.3 Life Cycle.Contribute’ elements.

NOTE: If this element is used, in elements ‘2.3.1 Life Cycle.Contribute.Role’ and ‘2.3.2 Life Cycle.Contribute.Entity’ there have to be values, i.e. they become mandatory elements. Use of ‘2.3.3 Life Cycle.Contribute.Date’ is recommended but not mandatory.

NOTE: This element concerns the contributors of the LO. Element ‘3.2 Meta-Metadata.Contribute’ concerns the contributors of the metadata instance itself.

1.3.5.1 Life Cycle.Contribute.Role – 2.3.1

‘2.3.1 Life Cycle.Contribute.Role’ is intended to describe the role of the contributor.

The value space for ‘2.3.1 Life Cycle.Contribute.Role’ element is a LOM Vocabulary. Information Model (Section 3) permits only one ‘2.3.1 Life Cycle.Contribute.Role’ element.

NOTE: only one value from the vocabulary is permitted.

Vocabulary values:

author

An entity primarily responsible for making the content of the LO. An author can be a person, institution, group or other entity (CanCore).

NOTE: If a team has made the LO usually only then there is need for identifying other roles than ‘Author’ (e.g ‘ Graphical designer’, ‘Technical implementer’, etc.)

publisher

The individual or organization responsible for making the LO available in its present form, such as a publishing house, a university department, or a corporate entity (Dublin Core).

unknown

The individual or organization whose role of contribution is not known.

initiator

The person, institution, or funding agency responsible for originally causing the development process. (CanCore).

terminator

The person or entity responsible for intentionally removing access to the LO (CanCore).

validator

The person or entity responsible for confirming the overall integrity of the LO (CanCore).

editor

The person or entity responsible for the revision of the LO for the purposes of publication or public presentation (CanCore).

graphical designer

The specialist or entity responsible for the construction of the visual elements of a LO (CanCore).

technical implementer

The specialist or entity responsible for the construction of the technical elements of a LO (usually software programmer).

content provider

The person or entity that is supplying content for the LO.

technical validator

The person or entity responsible for confirming the technical integrity of the LO (CanCore).

educational validator

The person or entity responsible for confirming the educational integrity of the LO (CanCore).

script writer

The person or entity responsible for the creation of a text read or performed in an audio, video, and/or interactive learning resource (CanCore).

instructional designer

The specialist or entity responsible for applying research-based principles to the design of the LO.

subject matter expert

The person or entity that is expert in the domain pertaining to the LO.

1.3.5.2 Life Cycle.Contribute.Entity – 2.3.2

‘2.3.2 Life Cycle.Contribute.Entity’ is intended for identification of and information about entities (i.e., people, organizations) contributing to the LO.

The value space for ‘2.3.2 Life Cycle.Contribute.Entity’ element is a IMC vCard 3.0. Information Model (Section 3) permits up to 40 ‘2.3.2 Life Cycle.Contribute.Entity’ elements.

NOTE: Minimum information about a person: name (first and last) and affiliation. Minimum information about organization: name and web page address.

1.3.6 Meta-Metadata.Language - 3.4

‘3.4 Meta-Metadata.Language’ is intended to describe the language of the metadata instance.

NOTE: This element concerns the language of the metadata instance. Element ‘1.3 General.Language’ concerns the language of the LO.

The value space for ‘3.5 Meta-Metadata.Language’ element is described in detail in paragraph 1.1.2 and there can be only one value.

The choice of language used in this element is used as the default language of all LangString data types in a metadata instance unless otherwise specified.

1.3.7 Technical.Format - 4.1

‘4.1 Technical.Format’ is intended to provide information about software needed to access the LO.

Value space for ‘4.1 Technical.Format’ element is described in detail in paragraph 1.5.1 and there can be up to 40 values.

MIME Types (actual values, e.g. “application/x-pn-realmedia”) are not necessarily exposed to users but they may be shown in a more human readable text. The applications, e.g. search engines and metadata tagging tools, are mapping MIME Types to words which are then shown to users by user interfaces. To avoid manual input, values for this element should be captured from, or supplied by, an electronic system whenever possible.

All the components of a LO should be described. If a LO comprises several MIME types (e.g. a Web page with images and videos), all types should be listed.

NOTE: If the format of a learning object is a content package, then this data element describes all the formats inside a package and the information about a package is provided in the element ‘4.8 Technical.Facet’.

NOTE: If there is additional information needed for technical format of a LO (e.g. “FlashPlayer 6 required”), it should be described as free text in ‘4.6 Technical.Description’ element.

1.3.8 Technical.Size - 4.2

‘4.2 Technical.Size’ is intended to provide information about the actual file size of the LO.

The value of ‘4.2 Technical.Size’ is expressed in bytes and there can be only one value.

Although the actual value is in bytes, user interfaces should give users a more friendly view of this data. If the LO is compressed, then this element should refer to the uncompressed size. To avoid manual input, values for this element should be captured from, or supplied by, an electronic system whenever possible.

1.3.9 Technical.Facet - 4.8

‘4.8 Technical.Facet’ is intended for classifying technical requirements of the LO.

The ‘4.8 Technical.Facet’ is a container element. Information Model (Section 3) permits up to fifteen ‘4.8 Technical.Facet’ elements.

NOTE: If this element is used, in elements ‘4.8.1 Technical.Facet.Name’ and ‘4.8.2 Technical.Facet.Value’ has to be values, i.e. then they are mandatory elements.

1.3.9.1 Technical.Facet.Name - 4.8.1

‘4.8.1 Technical.Facet.Name’ identifies the name of a technical facet of the learning object.

The value space for ‘4.8.1 Technical.Facet.Name’ element is a LRE Vocabulary. Information Model (Section 3) permits only one ‘4.8.1 Technical.Facet.Name’ element per facet.

Vocabulary values:

packaged format

A LO is a content package.

SCORM 1.2

A LO contains SCORM 1.2 API features.

SCORM 2004

A LO contains SCORM 2004 API features.

1.3.9.2 Technical.Facet.Value - 4.8.2

‘4.8.2 Technical.Facet.Value’ is intended to give the value of a technical facet of the learning object.

The value space for ‘4.8.2 Technical.Facet.Value’ element is a LRE Vocabulary. Information Model (Section 3) permits only one ‘4.8.2 Technical.Facet.Value’ element per facet.

NOTE: The vocabulary values depend on chosen ‘4.8.1 Technical.Facet.Name’.

Vocabulary values for ‘Packaged format’:

application/zip

A content package is in zip format.

Vocabulary values for ‘SCORM 1.2’ and ‘SCORM 2004’:

enhanced

A LO is enhanced when a SCORM 1.2 compatible player is available.

required

A LO requires a SCORM 1.2 compatible player.

1.3.10 Educational.Learning Resource Type - 5.2

‘5.2 Educational.Learning Resource Type’ is intended to indicate the potential educational use(s) or type(s) of the LO.

The value space for ‘5.2 Educational.Learning Resource Type’ element is a LRE Vocabulary. Information Model (Section 3) permits 16 different ‘5.2 Educational.Learning Resource Type’ elements.

It should be noted that many LOs have features from more than one of the following categories. For example, exploration LOs can contain drill and practice elements. Templates can be tagged as tools or guides and the use of free keywords for further description is recommended. One or more values from the LRE Vocabulary should be selected for this element. Elements are ordered so the first value is the most dominant kind.

There is no information concerning the intended audience for a LO in this element. '5.5 Educational.Intended End User Role' is intended to indicate the typical user of the LO.

Vocabulary values:

application

Computer software that is designed to enable end users to perform a specific task or group of tasks.

assessment

A resource whose primary purpose is the evaluation of the learner's ability, understanding, skills, performance, progress.

broadcast

A resource that is a recording of any radio or television programme broadcast over the airwaves or their digital equivalents (podcasts, webcasts, screencasts etc.)

case study:

The case study is the presentation, analysis and discussion of a case. It is a collaborative activities, or it is intended to be used in a group for discussion. Very often, the activity is designed to end with an elaboration of possible solutions proposed by the users and with a discussion with somebody who is a tutor or an expert in the field

course

A structured collection of teaching and learning materials (including tutorials) intended to achieve a wide range of objectives over an extended period of time.

demonstration

A resource involving real objects that uses a video or audio recording to show or explain a procedure, process or principle.

drill and practice

A resource consisting of exercises (drills), involving short sequences of practice, designed to teach users specific skills or help them memorise facts and procedures. They are very condition and action specific, usually containing only simple IF-THEN logic rules.

educational game

A resource that is both fun and educational, designed to teach pupils about a certain subject or to help them learn a skill as they play or are entertained.

enquiry-oriented activity

Material for an activity in which some or all of the information that the students interact with comes from resources on the Internet (webquest, caza del Tesoro ...)

experiment

A resource where actions or operations are undertaken (such as a scientific procedure) in order to discover something unknown, to test a hypothesis, or establish or illustrate some known truth.

exploration

A resource that encourages learners to explore and carry out their own investigations in order to understand a phenomenon, process or activity or to solve a specific problem. Some of these resources may have a minimum of instructions on how to proceed and the emphasis is much more on ‘discovery learning’ rather than didactic training.

glossary

A resource that is a collection of specialised terms and their meanings usually arranged in a specified order.

guide (advice sheets)

A resource such as a manual or tutorial that provides guidance on a particular topic and is usually also intended to be kept at hand for reference.

***learning asset*¹**

A single, multimedia asset or components that is used to create learning resources including learning objects - text, audio, photographs, graphics, short video clips. On their own, or grouped in collections, assets can be used to support learning in a wide variety of contexts. “Learning asset” is not a resource type but a category of resource types. The resource types belonging to this category are **audio, data, image, model, text** and **video**.

lesson plan

A resource that provides a teacher with a detailed description of all the elements needed to successfully deliver a specific lesson (lesson objectives, time required, resources etc.).

open activity

Material for artistic projects and creative exercises. Projects and exercises that are not very confined or limited. Many more complicated games that require more than simple logic belong to this category.

presentation

Information organised and delivered (often by using specific presentation software) by an instructor in order to inform a group about a topic.

project

Any resource which outlines ideas and procedures for project work. This could involve state exam projects, class projects, broader collaborative projects, cross-curricular projects, Transition Year projects, national or European projects and competitions.

reference

A resource such as a database, dictionary, encyclopaedia, glossary etc. that is a general source of information or which provides specific information on a topic or activity.

role play

¹ This term replaces ‘information asset’ from version .It is not an authorized value.

Material for an activity that implies the active participation of a learner in a concrete situation. The learner must play a role through which s/he should better understand the content or the topic dealt with in the resource.

simulation

A resource that explains a procedure, process or principle not by showing real objects or actions but by representing these – for example, by means of an animation.

tool

Editors and other kind of programs for producing something. Editors can process e.g. text or pictures and they can be used for creating and editing other LOs. Tools can also perform calculations or conversions.

web resource

This category includes types of learning resources that are based on web technology: weblog, web page, wiki and other web resource

weblog

An online publication (sometimes just called a ‘blog’) consisting primarily of a series of articles, written on a regular basis by an individual or a group.

web page

A collection of Web pages (containing a collection of hyperlinked documents and files) typically identified by a common IP address on the World Wide Web on the Internet.

wiki

A type of website that allows users to easily add and edit content and is especially suited for collaborative writing.

other web resource

Web resource that is not one of the above.

other

Learning resource type that is not one of the above.

1.3.11 Educational.Intended End User Role - 5.5

‘5.5 Educational.Intended End User Role’ is intended to indicate the typical user of the LO.

The value space for ‘5.5 Educational.Intended End User Role’ element is a LRE Vocabulary. The Information Model (Section 3) permits seven different ‘5.5 Educational.Intended End User Role’ elements.

One or more (up to seven) values from a LRE Vocabulary should be selected for this element. Elements are ordered such that the first value is the most frequently used. Four values (Author, Learner, Manager and Teacher) are the LOM vocabulary and the other three (Counsellor, Parent and Other) are extensions.

Vocabulary values:

author

An author creates or publishes a LO (LOM).

An author is defined as the person who originates or gives existence to anything (Oxford English Dictionary 2nd edition, OED).

An authoring tool that produces pedagogical material is a typical example of a learning object whose intended end user is an author.

counsellor

One who counsels or advises; an adviser (OED).

The role of the counsellor in school - where counselling is intended as a part of the 'guidance service' - consists of:

- Supporting pupils in their self-examination;
- Helping pupils to make the choices that are most consistent with their attitudes, competencies, perspectives, expectations;
- Assisting them in solving/discussing their emotional, interpersonal, adjustment problems - also by making them participate in dedicated groups;
- Providing pupils with information, advice, and clarifications;
- Assessing them through the administration of tests, questionnaires, interviews;
- Support them in strengthening their self-esteem and improving their self-concept.

learner

A learner works with a LO in order to learn something (LOM).

One who learns or receives instruction (OED).

manager

A manager manages the delivery of a LO (LOM). A person who organizes, directs, or plots something; a person who regulates or deploys resources (OED).

parent

A person who holds the position or exercises the functions of a parent; a protector or guardian (OED).

teacher

One who or that which teaches or instructs; an instructor (OED).

other

Role that is not one of the above.

1.3.12 Educational.Learning Context - 5.6

'5.6 Educational.Learning Context' is intended to indicate the institutional environment or the level of education appropriate for use of the LO.

The value space for ‘5.6 Educational. Learning Context’ element is a LRE Vocabulary. Information Model (Section 3) permits 12 different ‘5.6 Educational. Learning Context’ elements.

This vocabulary should be used in conjunction with element ‘5.7 Typical Age Range’ in order to express the full context. For example the value “Compulsory education” will be interpreted differently in different countries but is meant to indicate the regular schooling and other education after kindergarten and before higher education. In user interfaces the terms applicable in each country should be used and/or alternative vocabularies that map to this vocabulary could also be used.

One or more (up to 12) values from a LRE Vocabulary should be selected for this element.

Vocabulary values:

pre-school

A kindergarten or nursery school for children of preschool age. (OED)

compulsory education

Regular schooling and other education after kindergarten and before higher education.

special education

Designed or provided for persons who have special educational needs which prevent them from receiving (wholly) mainstream education. This value can be selected together with any other terms in this vocabulary in order to express special need in any context.

vocational education

Training or education that is pertaining or relating to a vocation or occupation.

higher education

Education provided by a college or university.

distance education

Instructional delivery that does not constrain the student to be physically present in the same location as the instructor.

continuing education

The further education of those over ordinary school age. Adult / continuing education is not related to job training in this context.

professional development

Training or education that is related to improving professional skills.

library

School libraries/documentation centres are places where the information skills are taught and the access to learning services, books, and multimedia resources in a school environment are organized.

educational administration

Management and administration of educational and training institutions.

policy making

Makers of policy decisions. This value is intended to indicate higher levels of decision-making than local institutional management.

other

Educational context that is not one of the above.

1.3.13 Educational.Typical Age Range - 5.7

‘5.7 Educational.Typical Age Range’ is intended to indicate the typical age of the user of the LO.

The value space for ‘5.7 Educational.Typical Age Range’ element is a minimum to maximum age range expressed in integral years and separated by a hyphen. Information Model (Section 3) permits only one ‘5.7 Educational.Typical Age Range’ element. Either minimum or maximum value can be set to U (undefined) meaning that then the range is extended in that way.

Used with ‘5.6 Educational.Context’ element, it is possible to indicate e.g. school levels and grades with enough precision. Because of very different school systems in different countries, it seems impossible to make comprehensive vocabularies that meet the needs of each country.

There are many possible options to hide the complexity of this solution from users. For example, it is possible to design the user interface so that it shows only one country’s school grade levels and the system maps those to the LRE ‘5.7 Educational.Typical Age Range’ and ‘5.6 Educational.Context’ elements. This solution keeps metadata meaningful and useful to users from other countries too.

1.3.14 Educational.Description - 5.10

‘5.10 Educational.Description’ is intended to provide a textual description of educational uses of the LO.

‘5.10 Educational.Description’ is a LangString (see paragraph 1.1.3 Data Types) element which provides a possibility to define the used language. Information Model permits ten different ‘5.10 Educational.Description’ elements and data type LangString ten different languages for each individual element. Each description can be up to 1000 character long.

There can be multiple values for the ‘5.10 Educational.Description’ element but they must be each in a different language.

NOTE: This element is for describing the *use* of a LO. A description of a LO and its content should be provided in ‘1.4 General.Description’.

1.4 Optional Elements

All other elements than the above described mandatory and recommended elements are considered as optional. Optional elements are described in full element set table (Section 3). Below follow some optional elements that need some more explanation.

1.4.1 Life Cycle.Contribute.Date – 2.3.3

‘2.3.3 Life Cycle.Contribute.Date’ is intended for the date of contribution.

The value space for ‘2.3.3 Life Cycle.Contribute.Date’ element is DateTime data type. Information Model (Section 3) permits only one ‘2.3.3 Life Cycle.Contribute.Date’ element.

1.4.2 Meta-Metadata.Contribute.Role – 3.2.1

‘3.2.1 Meta-Metadata.Contribute.Role’ is intended to describe the role of the contributor.

The value space for ‘3.2.1 Meta-Metadata.Contribute.Role’ element is a LOM Vocabulary. Information Model (Section 3) permits only one ‘3.2.1 Meta-Metadata .Contribute.Role’ element.

NOTE: only one value from the vocabulary is permitted.

Vocabulary values:

creator

A creator is the entity (person, organization, or indexing system) primarily responsible for making the content of the metadata record. A creator can be a person, institution, group, or other entity (CanCore).

enricher

An enricher is the entity (person, organization, or indexing system) responsible for enriching the content of the metadata record.

provider

A provider is the entity (person, organization, or indexing system) responsible for providing the metadata record.

validator

The entity that is primarily responsible for ensuring the syntactic and semantic integrity of the metadata record according to the rules and recommendations of the metadata schemas and quality control mechanisms. A validator can be a person, institution, group or other entity (CanCore).

1.4.3 Meta-Metadata.Contribute.Entity – 3.2.2

‘3.2.2 Meta-Metadata.Contribute.Entity’ is intended for identification of and information about entities (i.e., people, organizations) contributing to the metadata instance.

The value space for ‘3.2.2 Meta-Metadata.Contribute.Entity’ element is a IMC vCard 3.0. Information Model (Section 3) permits up to ten ‘3.2.2 Meta-Metadata.Contribute.Entity’ elements.

NOTE: Minimum information about a person: name (first and last) and affiliation. Minimum information about organization: name and web page address.

1.4.4 Meta-Metadata.Contribute.Date – 3.2.3

‘3.2.3 Meta-Metadata.Date’ is intended for the date of contribution.

The value space for ‘3.2.3 Meta-Metadata.Contribute.Date’ element is DateTime data type. Information Model (Section 3) permits only one ‘3.2.3 Meta-Metadata.Contribute.Date’ element.

1.4.5 Educational.Typical Learning Time - 5.9

‘5.9 Educational.Typical Learning Time’ is intended to indicate how long it will likely take a learner or other user to use the LO.

Value space for ‘5.9 Educational.Typical Learning Time’ element is described in detail in paragraph 1.1.3 Data Types and there can be only one value.

This element is especially useful for audio and video clips. Because the actual value is in Duration data type form, user interfaces should give users a more friendly view on this data. To avoid manual input, values for this element should be captured from or supplied by an electronic system whenever possible.

1.4.6 Classification.Keyword – 9.4

‘9.4 Classification.Keyword’ is not used in the MELT application profile.

NOTE: Recommended element ‘1.5 General.Keyword’ (see paragraph 1.3.3 General.Keyword).is to be used in place of ‘9.4 Classification.Keyword’ when values are free text such as in folksonomies.

1.5 Vocabularies

In this section the vocabularies used in the LRE application profile are discussed. Please note that it lists the actual tokens to be used.

1.5.1 Format - 4.1

All the MIME types based on IANA registration (see RFC2048:1996) are acceptable. Underneath follows a recommended minimum set for LRE.

application/base64
application/binary
application/java
application/macbinhex40
application/msexcel
application/msword
application/ogg
application/pdf
application/postscript
application/ppt
application/rtf
application/uue
application/x-compressed
application/x-gzip-compressed
application/x-pn-realmedia
application/x-shockwave-flash
application/x-stuffit
application/x-zip-compressed
application/zip
audio/basic
audio/midi
audio/mp3
audio/mpeg
audio/x-pn-realaudio
audio/x-pn-realaudio-plugin
audio/x-wav
image/bmp
image/gif
image/jpeg
image/png
image/tiff
image/x-wmf
model/vrml
text/html
text/plain
text/richtext
text/xml
video/avi
video/mpeg
video/x-pn-realvideo
video/x-pn-realvideo-plugin
video/quicktime

1.5.2 Learning Resource Type - 5.2

There are many LOs not belonging exactly in one category and in those cases one can choose multiple terms from a vocabulary. 'Learning asset' is a node label. This means that it is not intended for tagging the Learning Object but is a semantic grouping which can be used for instance in the search interface.

application
assessment
broadcast
case study
course
demonstration
drill and practice
educational game
enquiry-oriented activity
experiment
exploration
glossary
guide
<i>learning asset (not a token)</i>
audio
data
image
model
text
video
lesson plan
open activity
presentation
project
reference
role play
simulation
tool
<i>web resource (not a token)</i>
weblog
web page
wiki
other web resource
other

1.5.3 Intended End User Role - 5.5

author
counsellor

learner
manager
parent
teacher
other

1.5.4 Context - 5.6

pre-school
compulsory education
special education
vocational education
higher education
distance education
continuing education
professional development
library
educational administration
policy making
other

This vocabulary should be used in conjunction with element ‘5.7 Typical Age Range’ in order to express the full context. The value: ‘Compulsory education’ will be interpreted differently in different countries but is meant to indicate the regular schooling after kindergarten and before higher education. Those implementing the LRE application profile should, in their user interface, use the terms applicable in their country and even consider alternative vocabularies that map to the above vocabulary.

1.5.5 Typical Age Range - 5.7

Typical Age Range is expressed as a range Minimum-Maximum age in years.

Either minimum or maximum value can be set to U (undefined) meaning that then the range is extended in that way. e.g. ‘10-U’ means from year 10 up; ‘U-12’ means 12 years and younger.

1.5.6 Kind - 7.1

Value ‘Preview’ has been added to the LOM Vocabulary. It is intended to indicate that there is preview feature available and it is further specified in the ‘7.2 Relation.Resource’ element.

ispartof
haspart
isversionof
hasversion
isformatof
hasformat
references
isreferencedby

Deliverable Code: D 5.2
MELT Metadata Application Profile

Date: June 2007

isbasedon
isbasisfor
requires
isrequiredby
haspreview
ispreviewof
istranslationof
hastranslation
hasmetadata

2 BINDINGS

2.1 For LOM elements

The standard IEEE LOM binding (<http://ltsc.ieee.org/xsd/lomv1.0/lom.xsd>) serve as a basis for the LRE LOM binding that can be found at <http://fire.eun.org/xsd/lre/lre.xsd>.

2.2 For Vocabulary descriptions

Vocabularies are bound using the XVD² conceptual model.

Categories group data elements. The MELT Metadata Full Element Set (or LRE schema) is a hierarchy of data elements, including container (aggregate) data elements and simple data elements (leaf nodes of the hierarchy). In the LRE Schema, only leaf nodes have individual values defined through their associated value space and datatype. Container data elements in the LRE Schema do not have individual values. Consequently, they have no value space or datatype.

For each data element, the LRE Schema defines:

- name: the name by which the data element is referenced;
- explanation: the definition of the data element;
- multiplicity: the number of values allowed; the size is given as a single number - e.g. '1' - or as a range – e.g. '0..*' - where '*' indicates an unbounded maximum. When an unbounded maximum is defined this is followed by the smallest permitted maximum in parenthesis –e.g. '0..* (10)'. All applications that process LOM instances shall process at least that number of entries.
- order: whether the order of the values is significant (only applicable for data elements with more than one value).
- note: some specific remarks to be taken into account when using this data element
- example: an illustrative example.

For simple data elements, the LRE Schema also defines:

- value space: the set of allowed values for the data element – typically in the form of a vocabulary or a reference to another standard;
- datatype: indicates whether the values are LangString, DateTime, VocabularyTerm, CharacterString or Undefined. LangString and CharacterString may take a smallest permitted maximum length. All applications that process LRE instances shall provide strings with a maximum length not smaller than the smallest permitted maximum.

The numbering scheme of the data elements represents an aggregation hierarchy of data elements and their components.

² XVD stands for eXchange of Vocabularies and Descriptions.

3 MELT METADATA FULL ELEMENT SET

MELT METADATA FULL ELEMENT SET v1.0 (Based on IEEE Learning Object Metadata Information Model)								
Nr	Name	Description	Multiplicity	Order	Value space	Data type	Note	Example
1	General	This category groups the general information that describes this learning object as a whole.	1	Unspecified	-	-	-	-
1.1	Identifier	A globally unique label that identifies this learning object.	1..* (10)	Unordered	-	-	-	-
1.1.1	Catalog	The name or designator of the identification or cataloging scheme for this entry. A namespace scheme.	1	Unspecified	Repertoire of ISO/IEC 10646-1:2000	CharacterString (smallest permitted maximum: 1000 char)	-	"CELEBRATE", "ISBN", "ARIADNE", "URI"
1.1.2	Entry	The value of the identifier within the identification or cataloging scheme that designates or identifies this learning object. A namespace specific string.	1	Unspecified	Repertoire of ISO/IEC 10646-1:2000	CharacterString (smallest permitted maximum: 1000 char)	-	"DB123456", "2-7342-0318", "LEAO875", "http://foo.org/1234"
1.2	Title	Name given to this learning object.	0..1	Unspecified	-	LangString (smallest permitted maximum: 1000 char)	Recommended data element especially for non-trivial learning objects	("en", "Animal sounds from conifer forest")
1.3	Language	The primary human language or languages used within this learning object to communicate to the intended user.	1..* (10)	Unordered	1. use a 2 letter code from ISO 639-1. 2. use a 3 letter code from ISO 639-2 only if there isn't 2 letter code. 3. Add the ISO Country code [ISO3166] when necessary, separated by a dash. 4. use IANA registered language tags, prefixed with i- 5. use SIL Ethnologue 3-letter codes, prefixed with x-E- 6. make up a name for token languages prefixed with x-T-7. make up a name, prepended	CharacterString (smallest permitted maximum: 100 char)	This element corresponds with the Dublin Core element DC.Language. If it is not possible to identify any language for a learning object, as in a picture, then the appropriate value for this data element would be "x-none".	"fr", "en-GB"

					with x- for user defined languages. 8. 'x-none' is used when appropriate.			
1.4	Description	A textual description of the content of this learning object.	0..* (10)	Unordered	-	LangString (smallest permitted maximum: 2000 char)	Recommended data element. This element corresponds to the Dublin Core element DC.Description. NOTE: Only one description per language.	("en", "This is a collection of animal sounds recorded in conifer forest at different seasons")
1.5	Keyword	A keyword or phrase describing the topic of this learning object.	0..* (10)	Unordered	-	LangString (smallest permitted maximum: 1000 char)	Recommended data element. This is used for folksonomies	("en", "animal sounds") ("en", "lynx")
1.6	Coverage	The time, culture, geography or region to which this learning object applies.	0..* (10)	Unordered	-	LangString (smallest permitted maximum: 1000 char)	This element corresponds with the Dublin Core element DC.Coverage.	("en", "Northern hemisphere")
1.7	Structure	Underlying organizational structure of this learning object.	0..1	Unspecified	atomic collection networked hierarchical linear	VocabularyTerm (LOMv1.0)	This is a recommended element atomic: an object that is indivisible (in this context). collection: a set of objects with no specified relationship between them. networked: a set of objects with relationships that are unspecified. hierarchical: a set of objects whose relationships can be represented by a tree structure. linear: a set of objects that are ordered according to "previous"/"next" relationships.	-
1.8	Aggregation Level	The functional granularity of this learning object.	0..1	Unspecified	1 – 4	VocabularyTerm (enumerated) (LOMv1.0)	1: the smallest level of aggregation, e.g., raw media data or fragments. 2: a collection of level 1 learning objects, e.g., a lesson.	-

							3: a collection of level 2 learning objects, e.g., a course. 4: the largest level of granularity, e.g., a set of courses that lead to a certificate. NOTE 1:--Level 4 objects can contain level 3 objects, or can recursively contain other level 4 objects.	
2	Life Cycle	This category describes the history and current state of this learning object and those entities that have affected this learning object during its evolution.	0..1	Unspecified	-	-	Recommended data element	-
2.1	Version	The edition of this learning object.	0..1	Unspecified	-	LangString (smallest permitted maximum: 50 char)	-	("en", "1.2.alpha"), ("fi", "toinen luonnos")
2.2	Status	The completion status or condition of this learning object.	0..1	Unspecified	draft final revised unavailable	VocabularyTerm (LOMv1.0)	When the status is "unavailable" it means that the learning object itself is not available. The word 'pending' is suggested to be used instead of 'unavailable' in user interface.	-
2.3	Contribute	Those entities (i.e., people, organizations) that have contributed to the state of this learning object during its life cycle (e.g., creation, edits, publication).	0..* (30)	Ordered	-	-	Recommended data element This data element is different from 3.3: Meta-Metadata.Contribute. Contributions should be considered in a very broad sense here, as all actions that affect the state of the learning object.	-
2.3.1	Role	Kind of contribution.	1	Unspecified	author publisher unknown initiator terminator validator editor graphical designer	VocabularyTerm (LOMv1.0)	Minimally, the Author(s) of the learning object should be described.	-

					technical implementer content provider technical validator educational validator script writer instructional designer subject matter expert			
2.3.2	Entity	The identification of and information about entities (i.e., people, organizations) contributing to this learning object. The entities shall be ordered as most relevant first.	1..* (40)	Ordered	vCard, as defined by IMC vCard 3.0 (RFC 2425, RFC 2426).	CharacterString (smallest permitted maximum: 1000 char)	If Role (2.3.1) is "author", then the entity is typically a person and this element corresponds with the Dublin Core element DC.Creator. If Role equals "publisher", then the entity is typically an organization and this element corresponds with the Dublin Core element DC.Publisher. If Role is not equal to "author" or "publisher", then this element corresponds with the Dublin Core element DC.Contributor.	
2.3.3	Date	The date of the contribution.	0..1	Unspecified	-	DateTime	-	"2003-03-13"
3	Meta-Metadata	This category describes this metadata record itself. This category describes how the metadata instance can be identified, who created this metadata instance, how, when, and with what references.	0..1	Unspecified	-	-	Recommended data element This is not the information that describes the learning object itself.	-
3.1	Identifier	A globally unique label that identifies this metadata record.	0..* (10)	Unordered	-	-	-	-
3.1.1	Catalog	The name or designator of the identification or cataloging scheme for this entry. A namespace scheme.	1	Unspecified	Repertoire of ISO/IEC 10646-1:2000	CharacterString (smallest permitted maximum: 1000 char)	-	"ARIADNE", "URI"
3.1.2	Entry	The value of the identifier within the identification or	1	Unspecified	Repertoire of ISO/IEC 10646-1:2000	CharacterString (smallest permitted	-	"KUL532", "http://foo.org/desc/1234"

		cataloging scheme that designates or identifies this learning object. A namespace specific string.				maximum: 1000 char)		
3.2	Contribute	Those entities (i.e., people, organizations) that have affected the state of this metadata during its life cycle (e.g., creation, validation).	0..* (10)	Ordered	-	-	Recommended data element This data element is concerned with contributions to the metadata. Data element 2.3: Lifecycle.Contribute is concerned with contributions to the learning object.	-
3.2.1	Role	Kind of contribution.	1	Unspecified	creator enricher provider validator	VocabularyTerm (LREv3.0)	Exactly one instance of this data element with value "creator" should exist.	-
3.2.2	Entity	The identification of and information about entities (i.e., people, organizations) contributing to this metadata. The entities shall be ordered as most relevant first.	1..* (10)	Ordered	vCard, as defined by IMC vCard 3.0 (RFC 2425, RFC 2426).	CharacterString (smallest permitted maximum: 1000 char)	-	-
3.2.3	Date	The date of the contribution.	0..1	Unspecified	-	DateTime	-	"2003-03-13"
3.3	Metadata Schema	The name and version of the authoritative specification used to create this metadata instance.	0..* (10)	Unordered	Repertoire of ISO/IEC 10646-1:2000	CharacterString (smallest permitted maximum: 30 char)	If multiple values are provided, then the metadata instance shall conform to multiple metadata schemas. NOTE: This element is not supposed to be exposed to the users.	"CELEB_MDv1.0"
3.4	Language	Language of this metadata instance. This is the default language for all LangString values in this metadata instance. If a value for this data element is not present in a metadata instance, then there is no default language for LangString values.	0..1	Unspecified	See 1.3:General.Language For this data element, "none" shall not be an acceptable value.	CharacterString (smallest permitted maximum: 100 char)	Recommended data element This data element concerns the language of the metadata instance. Data element 1.3: General.Language concerns the language of the learning object.	"en"

4	Technical	This category describes the technical requirements and characteristics of this learning object.	1	Unspecified	-	-	-	-
4.1	Format	Technical datatype(s) of (all the components of) this learning object.	0..* (40)	Unordered	MIME types based on IANA registration (see RFC2048:1996)	CharacterString (smallest permitted maximum: 500 char)	Recommended data element This element corresponds with the Dublin Core element DC.Format. This data element shall be used to identify the software needed to access the learning object.	"image/ gif", "application/x-director", "text/ xml"
4.2	Size	The size of the digital learning object in bytes (octets). The size is represented as a decimalvalue (radix 10). Consequently, only the digits "0" through "9" should be used. The unit is bytes, not Mbytes, GB, etc.	0..1	Unspecified	ISO/IEC 646:1991, but only the digits "0".. "9"	CharacterString (smallest permitted maximum: 30 char)	Recommended data element This data element shall refer to the actual size of this learning object. If the learning object is compressed, then this data element shall refer to the uncompressed size.	"44000"
4.3	Location	A string that is used to access this learning object. It may be a location (e.g., Universal Resource Locator), or a method that resolves to a location (e.g., Universal Resource Identifier). The first element of this list shall be the preferable location.	1..* (10)	Ordered	Repertoire of ISO/IEC 10646-1:2000	CharacterString (smallest permitted maximum: 1000 char) See also chapter 2.2.1.2 Technical.Location – 4.3	This is where the learning object described by this metadata instance is physically located.	"http://host/path/to/resource"
4.4	Requirement	The technical capabilities necessary for using this learning object. If there are multiple requirements, then all are required, i.e., the logical connector is AND.	0..* (40)	Unordered	-	-	This element needs further examination in context of LRE. Required SCORM version is a one example of possible additions.	-
4.4.1	OrComposite	Grouping of multiple requirements. The composite requirement is satisfied when one of the	0..* (40)	Unordered	-	-	-	-

		component requirements is satisfied, i.e., the logical connector is OR.						
4.4.1.1	Type	The technology required to use this learning object, e.g., hardware, software, network, etc.	0..1	Unspecified	operating system browser	VocabularyTerm (LOMv1.0)	-	-
4.4.1.2	Name	Name of the technology required to use this learning object	0..1	Unspecified	if Type='operating system', then: pc-dos ms-windows macos unix multi-os none if Type='browser' then : any netscape communicator ms-internet explorer opera amaya	VocabularyTerm (LOMv1.0)	The value for this data element may be derived from 4.1:Technical.Format automatically, e.g., "video/mpeg" implies "multi-os".	-
4.4.1.3	Minimum Version	Lowest possible version of the required technology to use this learning object.	0..1	Unspecified	Repertoire of ISO/IEC 10646-1:2000	CharacterString (smallest permitted maximum: 30 char)	-	"4.7"
4.4.1.4	Maximum Version	Highest possible version of the required technology to use this learning object.	0..1	Unspecified	Repertoire of ISO/IEC 10646-1:2000	CharacterString (smallest permitted maximum: 30 char)	-	"7.0"
4.5	Installation Remarks	Description of how to install this learning object.	0..1	Unspecified	-	LangString (smallest permitted maximum: 1000 char)	-	("en", "Launch the self- extracting executable and follow the instructions on screen")
4.6	Other Platform Requirements	Information about other software and hardware requirements.	0..1	Unspecified	-	LangString (smallest permitted maximum: 1000 char)	-	("en", "microphone"), ("en", "Java 2 RE, http://java.sun.com/j2se/")
4.7	Duration	Time a continuous learning object takes when played at intended speed.	0..1	Unspecified	-	Duration	This data element is especially useful for sounds, movies or animations.	"PT1H30M", "PT50S"
4.8.	Facet	A technical facet. of a learning object	0..* (15)	Unordered	-	-	A facet can be used for classifying technical requirements. It is likely that the vocabulary in 4.8.1 will be extended	-

4.8.1	Name	The name of a technical facet of the learning object	1	Unspecified	packaged format SCORM 1.2 SCORM 2004	VocabularyTerm (LREv3.0)		-
4.8.2	Value	The value of a technical facet of the learning object	1	Unordered	If Name= 'packaged format', then: application/zip If Name= 'SCORM 1.2', then: enhanced required Only one value is allowed	VocabularyTerm (LREv3.0)		
4.8.3	Description	A textual description of the technical facet of the learning object	0..1	Unspecified	-	LangString (smallest permitted maximum: 2000 char)	NOTE: Only one description per language.	-
5	Educational	This category describes the key educational or pedagogic characteristics of this learning object.	0..* (100)	Unspecified	-	-	Recommended data element	-
5.1	Interactivity Type	Definition of a LO according to the interactivity type.	0..1	Unspecified	active expositive mixed	VocabularyTerm (LOMv1.0)	"active": LO that directly induces productive action by the learner. An active learning object prompts the learner for semantically meaningful input or for some other kind of productive action or decision, not necessarily performed within the learning object's framework. "expositive": LO that displays information but does not prompt the learner for any semantically meaningful input. "mixed": LO that blends the active and expositive interactivity types.	Active LOs: · Assessment · Drill and practice Expositive LOs: · Guide · Glossary - Information resource Mixed LOs: · Information resource with exploration elements

							NOTE:--Activating links to navigate in hypertext documents is not considered to be a productive action.	
5.2	Learning Resource Type	Specific kind of learning object, The most dominant kind first.	0..* (10)	Ordered	application assessment broadcast case study course demonstration drill and practice educational game enquiry-oriented activity experiment exploration glossary guide <i>learning asset (not a token)</i> audio data image model text video lesson plan open activity presentation project reference role play simulation tool <i>web resource (not a token)</i> weblog web page wiki other web resource other	VocabularyTerm (LREv3.0)	Recommended data element 'Learning asset' and 'web resource' are node labels. This means that it is not intended for tagging the Learning Object but is a semantic grouping which can be used for instance in the search interface.	
5.3	Interactivity Level	The degree of interactivity characterizing this learning object. Interactivity in this context refers to the degree to which the learner is supposed to take an active part in dealing with the learning object.	0..1	Unspecified	very low low medium high very high	VocabularyTerm (LOMv1.0)	Inherently, this scale is meaningful within the context of a community of practice.	Learning objects with 5.1: Educational.InteractivityType="active" may have a high interactivity level (e.g., a simulation environment endowed with many controls) or a low interactivity level (e.g., a written set of instructions that solicit an activity). Learning objects with 5.1:

								Educational.InteractivityType="expositive" may have a low interactivity level (e.g., a piece of linear, narrative text produced with a standard word processor) or a medium to high interactivity level (e.g., a sophisticated hyperdocument, with many internal links and views).
5.4	Semantic Density	The degree of conciseness of a learning object. The semantic density of a learning object may be estimated depending on the relation between the amount of information provided and the size, span or duration of the LO	0..1	Unspecified	very low low medium high very high	VocabularyTerm (LOMv1.0)	Inherently, this scale is meaningful within the context of a community of practice. The semantic density of a learning object is independent of its difficulty. It is best illustrated with examples of expositive material, although it can be used with active resources as well.	
5.5	Intended End User Role	Role of principal user(s) for which this learning object was designed, most dominant first.	0..7	Ordered	author counsellor learner manager parent teacher other	VocabularyTerm (LREv3.0)	Recommended data element.	-
5.6	Context	The principal environment within which the learning and use of this learning object is intended to take place.	0..12	Unordered	pre-school compulsory education special education vocational education higher education distance education continuing education professional development library educational administration policy making other	VocabularyTerm (LREv3.0)	Recommended data element	-
5.7	Typical Age Range	Age of the typical intended user.	0..1	Unordered	Typical Age Range is expressed as a range Minimum-Maximum age in years	LangString	Recommended data element. Either minimum or maximum value can be set to U (undefined) meaning that then the range is extended in that way.	"10-12" "7-U" "U-12"

5.8	Difficulty	How hard it is to work with or through this learning object for the typical intended target audience.	0..1	Unspecified	very easy easy medium difficult very difficult	VocabularyTerm (LOMv1.0)	-	-
5.9	Typical Learning Time	Approximate or typical time it takes to work with or through this learning object for the typical intended target audience.	0..1	Unspecified	-	Duration	-	"PT1H", "P5D"
5.10	Description	Comments on how this learning object is to be used.	0..* (10)	Unspecified	-	LangString (smallest permitted maximum: 1000 char)	Recommended data element NOTE: only one description per language.	-
5.11	Language	The human language(s) used by the typical intended user of this learning object.	0..* (10)	Unordered	See 1.3:General.Language	CharacterString (smallest permitted maximum: 100 char)	-	"de", "fr", "it"
6	Rights	This category describes the intellectual property rights and conditions of use for this learning object.	1..* (10)	Unspecified	-	-	-	-
6.1	Cost	Whether use of this learning object requires payment.	1	Unspecified	no	VocabularyTerm (LOMv1.0)	In MELT there should at least one creative commons license which by definition has no cost attached	-
6.2	Copyright and Other Restrictions	Whether copyright or other restrictions apply to the use of this learning object.	1	Unspecified	yes	VocabularyTerm (LOMv1.0)	In MELT there should at least one creative commons license which is then given in 6.3	-
6.3	Description	Comments on the conditions of use of this learning object.	1	Unspecified	-	LangString (smallest permitted maximum: 1000 char)	Mandatory if 6.2 equals "yes" NOTE: Only one description per language. Also token languages can be used. For creative commons RDF expression, 'x-t-cc' should be used as the language. For a creative commons expression 'x-t-cc' should be used.	("en", "See copyright notice: http://foo.org/rights.html ")
7	Relation	This category defines the relationship between this	0..* (100)	Unordered	-	-	To define multiple relationships, there may be	-

		learning object and other learning objects, if any.					multiple instances of this category. If there is more than one target learning object, then each target shall have a new relationship instance.	
7.1	Kind	Nature of the relationship between this learning object and the target learning object identified by 7.2: Relation.Resource.	0..1	Unspecified	Based on Dublin Core: ispartof haspart isversionof hasversion isformatof hasformat references isreferencedby isbasedon isbasisfor requires isrequiredby haspreview ispreviewof istranslationof hasttranslation hasmetadata	VocabularyTerm (LREv3.0)	This element loosely corresponds with the Dublin Core element DC.Relation. NOTE: 'haspreview', 'ispreviewof', 'istranslationof', 'hasttranslation' and 'hasmetadata' added to the LOM vocabulary	-
7.2	Resource	The target learning object that this relationship references.	0..1	Unspecified	-	-	-	-
7.2.1	Identifier	A globally unique label that identifies the target learning object.	0..* (10)	Unordered	-	-	-	-
7.2.1.1	Catalog	The name or designator of the identification or cataloging scheme for this entry. A namespace scheme.	0..1	Unspecified	Repertoire of ISO/IEC 10646-1:2000	CharacterString (smallest permitted maximum: 1000 char)	-	"CELEBRATE", "ISBN", "ARIADNE", "URI"
7.2.1.2	Entry	The value of the identifier within the identification or cataloging scheme that designates or identifies this learning object. A namespace specific string.	0..1	Unspecified	Repertoire of ISO/IEC 10646-1:2000	CharacterString (smallest permitted maximum: 1000 char)	-	"DB123456", "2-7342-0318", "LEAO875", "http://foo.org/1234"
7.2.2	Description	Description of the target learning object.	0..* (10)	Unspecified	-	LangString (smallest permitted maximum: 1000 char)	NOTE: Only one description per language.	-
8	Annotation	This category provides	0..* (30)	Unordered	-	-	This category enables	-

		comments on the educational use of this learning object, and information on when and by whom the comments were created.					educators to share their assessments of learning objects, suggestions for use, etc.	
8.1	Entity	Entity (i.e., people, organization) that created this annotation.	0..1	Unspecified	vCard, as defined by IMC vCard 3.0 (RFC 2425, RFC 2426).	CharacterString (smallest permitted maximum: 1000 char)	-	-
8.2	Date	Date that this annotation was created.	0..1	Unspecified	-	DateTime	-	"2003-13-03"
8.3	Description	The content of this annotation.	1	Unspecified	-	LangString (smallest permitted maximum: 1000 char)	NOTE: Only one description per language.	-
9	Classification	This category describes where this learning object falls within a particular classification system.	1..* (40)	Unspecified	-	-	It is mandatory to have at least one element 9 with Purpose that equals 'discipline'	-
9.1	Purpose	The facets taken into account for classifying this learning object.	1	Unspecified	discipline idea prerequisite educational objective accessibility restrictions educational level skill level security level competency	VocabularyTerm (LOMv1.0)	at least one element 9.1: Purpose that equals 'discipline'.	-
9.2	Taxon Path	A taxonomic path in a specific classification system. Each succeeding level is a refinement in the definition of the preceding level.	0..* (15)	Unordered	-	-	There may be different paths, in the same or different classifications, which describe the same characteristic. - When element 9.1: Purpose equals 'discipline', this element is mandatory and the source of keywords is LRE Thesaurus.	-
9.2.1	Source	The name of the classification system.	0..1	Unspecified	-	LangString (smallest permitted	This data element may use	-

						maximum: 1000 char)	any recognized "official" taxonomy, or any user-defined taxonomy. A tool may provide the top-level entries of a well-established classification (LOC, UDC, DDC, etc.).	
9.2.2	Taxon	A particular term within a taxonomy. A taxon is a node that has a defined label or term. A taxon may also have an alphanumeric designation or identifier for standardized reference. Either or both the label and the entry may be used to designate a particular taxon.	1..* (15)	Ordered	-	-	An ordered list of taxons creates a taxonomic path, i.e., "taxonomic stairway": this is a path from a more general to more specific entry in a classification.	
9.2.2.1	Id	The identifier of the taxon, such as a number or letter combination provided by the source of the taxonomy.	0..1	Unspecified	Repertoire of ISO/IEC 10646-1:2000	CharacterString (smallest permitted maximum: 100 char)	-	
9.2.2.2	Entry	The textual label of the taxon.	0..1	Unspecified	-	LangString (smallest permitted maximum: 500 char)	-	
9.3	Description	A textual description of learning object relative to its stated purpose.	0..1	Unspecified	-	LangString (smallest permitted maximum: 2000 char)	This element should not be used when element 9.1: Purpose equals 'discipline' in order to avoid confusion with 1.4: General.Description. NOTE: Only one description per language.	
9.4	Keyword	Contains keyword description of learning objective relative to its stated purpose.	0..* (40)	Unordered	-	LangString (smallest permitted maximum: 1000 char)	This element should not be used when element 9.1: Purpose equals 'discipline' For free text keywords such as folksonomies use is 1.5: General.Keyword.	

LangString

Nr	Name	Description	Multiplicity	Order	Value space	Data type	Note	Example
1	LangString	A datatype that represents one or more character strings. A LangString value may include multiple semantically equivalent character strings, such as translations or alternative descriptions.	1..* (10)	Unspecified	-	-	-	-
1.1	Language	Human language of the character string.	1	Unspecified	See 1.3:General.Language NOTE: "x-none" (accepted value in 1.3) is not acceptable in this element.	CharacterString (smallest permitted maximum: 100 char)	-	-
1.2	String	Actual character string..	1	Unspecified	-	CharacterString	-	-

DateTime

Nr	Name	Description	Multiplicity	Order	Value space	Data type	Note	Example
1	DateTime	A point in time with accuracy at least as small as one second.	1	Unspecified	YYYY[-MM[-DD[Thh[:mm[:ss[.s[TZD]]]]]]] where: YYYY = four-digit year MM = two-digit month DD = two-digit day of month hh = two digits of hour (00 through 23) mm = two digits of minute (00 through 59) ss = two digits of second (00 through 59) s = one or more digits representing a decimal fraction of a second TZD = time zone designator ("Z" for UTC or +hh:mm or -hh:mm) At least the four digit year must be present. If additional parts of the DateTime are included, the character literals "-", "T", ":", and "." are part of the character lexical representation for the datetime. If the time portion is present, but the time zone designator is not present, the time zone is interpreted as being UTC.	CharacterString (smallest permitted maximum: 200 char)	-	"2003-05-16", "2003-06-06T14:00:15"
2	Description	Description of the date.	1	Unspecified	-	LangString (smallest permitted maximum: 1000 char)	-	-

Duration

Nr	Name	Description	Multi- plicity	Order	Value space	Data type	Note	Example
1	Duration	An interval in time with accuracy at least as small as one second.	1	Unspecified	P[yY][mM][dD][T[hH][mM][s.s]S]] where: y = number of years (integer, > 0) m = number of months (integer, > 0) d = number of days (integer, > 0) h = number of hours (integer, > 0) n = number of minutes (integer, > 0) s = number of seconds or fraction of seconds(integer, > 0) The character literal designators "P", "Y", "M", "D", "T", "H", "M", "S" must appear if the corresponding nonzero value is present. If the value of years, months, days, hours, minutes or seconds is zero, the value and corresponding designation (e.g., "M") may be omitted, but at least one designator and value must always be present. The designator "P" is always present. The designator "T" shall be omitted if all of the time (hours/minutes/seconds) are zero. Negative durations are not supported.	CharacterString (smallest permitted maximum: 200 char)	-	"PT1H30M"
2	Description	Description of the duration.	1	Unspecified	-	LangString (smallest permitted maximum: 1000 char)	-	-

VocabularyTerm

Nr	Name	Description	Multi- plicity	Order	Value space	Data type	Note	Example
1	Source	An indication of the source of the value, for instance through a URI.	1	Unspecified	LOMv1.0 LREv3.0 <URI to an external vocabulary>	CharacterString (smallest permitted maximum: 1000 char)	-	"http://www.cenorm.be/vocs/lomv1p0:context"
2	Value	The actual value.	1	Unspecified	-	LangString (smallest permitted maximum: 1000 char)	If the vocabulary is used by machines then value would be typically a machine readable token; for example an identifier.	"school"