

# **IEEE P1484.12.4™/D1**

## **Draft Recommended Practice for Expressing IEEE Learning Object Metadata Instances Using the Dublin Core Abstract Model**

Prepared by the Learning Object Metadata Working Group of the  
Learning Technology Standards Committee

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**Abstract:** This Recommended Practice describes how to construct IEEE Learning Object Metadata instances using the Dublin Core Abstract Model.

**Keywords:** Dublin Core, learning object, learning object metadata (LOM), metadata.

## Introduction

(This introduction is not part of IEEE P1484.12.4/D1 Draft Recommended Practice for Expressing IEEE Learning Object Metadata Instances Using the Dublin Core Abstract Model.)

There is an increasing demand for interoperable definitions of Dublin Core Metadata Initiative (DCMI) metadata terms and IEEE Learning Object Metadata (LOM) data elements which allow these to be used together in metadata instances.

This Recommended Practice addresses this requirement by describing how to use IEEE LOM metadata in Dublin Core metadata instances.

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## Participants

At the time this draft Recommended Practice was completed, the Learning Object Metadata Working Group had the following membership:

**<Chair Name>**, *Chair*

**<Vice-chair Name>**, *Vice-chair*

Participant1  
Participant2  
Participant3

Participant4  
Participant5  
Participant6

Participant7  
Participant8  
Participant9

The following members of the balloting committee voted on this Recommended Practice. Balloters may have voted for approval, disapproval, or abstention.

(to be supplied by IEEE)



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# Draft Recommended Practice for Expressing IEEE Learning Object Metadata Instances Using the Dublin Core Abstract Model

## Overview

## Scope

This Recommended Practice describes how to construct IEEE Standard for Learning Object Metadata (LOM) (IEEE Std 1484.12.1-2002) instances using the Dublin Core Abstract Model (DCAM). It describes how to use the definitions of metadata terms defined by the IEEE Standard for Resource Description Framework (RDF) Vocabulary for IEEE Learning Object Metadata (LOM) Data Elements (IEEE Std 1484.12.5-2009) together with DCMI metadata terms for expressing IEEE LOM conforming instances as DCAM description sets. This Recommended Practice does not address the issue of expressing DCAM description sets or DCMI metadata terms using LOM data elements.

## Purpose

There is an increasing demand for interoperable definitions of Dublin Core Metadata Initiative (DCMI) metadata terms and IEEE Learning Object Metadata (LOM) data elements which allow these to be used together in metadata instances. This Recommended Practice addresses this requirement by describing how to use the definitions of metadata terms defined by the IEEE Standard for Resource Description Framework (RDF) Vocabulary for IEEE Learning Object Metadata (LOM) Data Elements (IEEE Std 1484.12.x-200x) and DCMI metadata terms together in Dublin Core metadata instances. This represents a partial and short-term solution to the overall issue of metadata interoperability in learning, education, and training contexts. The Recommended Practice also aims to inform the longer-term process of trying to align the abstract models of IEEE LOM and DCAM, as it will provide an analysis of fundamental incompatibilities between the two models.

## References

IEEE LOM

W3C RDF

RFC 3986 (URI)

Dublin Core Abstract Model

Dublin Core Metadata Terms

DC-TEXT syntax

IEEE Standard for Resource Description Framework (RDF) Vocabulary for IEEE Learning Object Metadata (LOM) Data Elements (IEEE Std 1484.12.5-2009)

## Definitions

**LOM element occurrence** – occurrence of a LOM data element within a LOM metadata instance

**LOM metadata instance** – a set of LOM data elements conforming to IEEE Std 1484.12.1-2002 (LOM)

## Requirements and completeness

This Recommended Practice describes how to express a *strictly conforming* LOM metadata instance using a metadata instance conforming to the DCMI Abstract Model. Strict conformance is defined in IEEE 1484.12.1-2002 (LOM) as metadata instances that “consist solely of LOM data elements”.

Therefore, this Recommended Practice does not specify how to map extensions to the LOM data model. LOM instances that are not strictly conforming can be partially mapped by first reducing them to a strictly conforming instance through removal of non-LOM elements.

All data values of LOM elements can be mapped, with two exceptions:

- LOM element 7.1 Relation.Kind, where the mapping has requirements that are not always fulfilled for vocabularies with a Source other than “LOMv1.0”.
- LOM category 5 Educational, where only a single instance of the category is supported by the mapping.

In some cases, the ordering of data elements is lost in the translation. See section ZZZ.

## Structure of the generated metadata instance

For each LOM element, Section XXXX contains a description of how an occurrence of the element should be expressed in a DCAM conforming metadata instance. The DC-TEXT format is used as a representation of the resulting metadata instance.

The generated metadata instance contains a DCAM *description set* describing two principal resources: the described learning object, denoted *LO* in Section XXXX, and the metadata record, denoted *MD*. In addition, other resources are introduced as required to represent the values of LOM data elements. For example, each occurrence of LOM category 8 Annotation is represented as a description of a distinct resource, described by a distinct set of statements.

NOTE – the DCMI produces specifications for expressing DCAM-compatible metadata using XML, RDF, and HTML/XHTML.

## Procedure for expressing a LOM metadata instance



A LOM metadata instance should be expressed using a DC-TEXT instance as follows:

1. First, the namespace declarations, as described in Section XXXX are added.
2. Then, for each occurrence of a LOM element:
  - 2.a The LOM element occurrence is expressed using the table in Section XXXX. The result is appended to the DC-TEXT instance
  - 2.b Step 2 is repeated for each occurrence of a sub-element. In this step, contextual information about how the enclosing elements were mapped may be needed.

The resulting document is a valid DC-TEXT instance.

Note – there are many ways to restructure the DC-TEXT instance in order to simplify the structure without affecting the interpretation of the DC-TEXT instance.

## Namespace abbreviations

Throughout Section XXXXX, URI abbreviations are used for *property* URIs, *syntax encoding scheme* URIs and *vocabulary encoding scheme* URIs. A URI abbreviation is of the form

*prefix:localName*

To expand an abbreviation of the above form to a full URI, the string “*prefix:*” is replaced with the corresponding namespace URI, according to the following table:

Prefix	Namespace URI	Description
lom	<a href="http://ltsc.ieee.org/rdf/lomv1p0/terms#">http://ltsc.ieee.org/rdf/lomv1p0/terms#</a>	The LOM terms namespace
lomvoc	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocab#">http://ltsc.ieee.org/rdf/lomv1p0/vocab#</a>	The LOMv1.0 vocabulary namespace
dcterms	<a href="http://purl.org/dc/terms/">http://purl.org/dc/terms/</a>	The DCMI terms namespace
xsd:	<a href="http://www.w3.org/2001/XMLSchema#">http://www.w3.org/2001/XMLSchema#</a>	XML Schema datatypes namespace.

This corresponds to the following header in the target DC-TEXT document:

```
@prefix lom:      http://ltsc.ieee.org/rdf/lomv1p0/terms# .
@prefix lomvoc:   http://ltsc.ieee.org/rdf/lomv1p0/vocab# .
@prefix dcterms:  http://purl.org/dc/terms/ .
@prefix xsd:      http://www.w3.org/2001/XMLSchema# .
```

Note – as the chosen prefix does not affect the interpretation of DC-TEXT instances, an application may use other prefixes for the namespaces, as long as the resulting URIs are correct.

## Columns in the translation table

### “LOM element” column

Each entry in this column lists a LOM element that will be mapped.

### “DC-TEXT representation” column

This column describes how the LOM element should be expressed using the DC-TEXT format. An entry in this column is a DC-TEXT fragment. The fragment represents one or more DCAM *descriptions*.

For certain LOM elements, the content of this column is “N/A”, meaning that the element should not be mapped to any DCAM metadata. The sub-elements should still be mapped to DCAM metadata.

The content of this column uses certain conventions, listed below.

### Conventions for ValueId

The DC-TEXT component **ValueId** is used to assign an identifier to the value resource of a DCAM statement, so that the same resource can be referenced within a separate DCAM description. It has no direct interpretation in terms of the DCAM, and the identifier is local to the current DC-TEXT document.

When a **ValueId** component is generated, a identifier that is unique within the target DC-TEXT instance should be generated. The identifier is then used in the translation of the element or its sub-elements.

### Conventions for ResourceId

The DC-TEXT component **ResourceId** is used to distinguish descriptions of distinct resources within the same DC-TEXT document. It has no direct interpretation in terms of the DCAM. Within this standard, **ResourceId** is one of the following:

1. *LO* - the described resource is the learning object.
2. *MD* - the described resource is the metadata instance
3. in all other cases, the resource is one introduced by the **ValueId** component, either within the mapping of the element or of an enclosing LOM element. See the section on **ValueId** above.

### Conventions for complex LOM values

Some LOM element has a value of a complex type, such as **LangStrings**, **DateTimes** and **Durations**. The contents of such data values need to be referenced in the translation. The contents of complex values are referenced as follows:

- A **LangString** is referenced as a set of pairs of the form **(String, Language)**, where **String** is a character string and **Language** is a language tag.
- A **DateTime** is referenced as a pair of the form **(Date, Description)**, where **Date** is a formatted date string and **Description** is a LangString
- A **Duration** is referenced as a pair of the form **(Duration, Description)**, where **Duration** is a formatted duration string and **Description** is a LangString
- A **Vocabulary** is referenced as a pair of the form **(VocSource, VocValue)**, where **VocSource** and **VocValue** are character strings.

### Conventions for LOM vocabulary values

Many LOM elements use values of type **Vocabulary**. Whenever possible, a URI identifying the vocabulary value should be used. Annex ZZZZ lists URIs for all vocabulary terms defined in the LOM standard.

If there is no known URI identifying the value (typically, when using an external vocabulary with no known URIs), an alternative representation may be used.

- Replace

ValueURI ( **VocURI** )

with

ValueID ( *VocID* )

where *VocID* is a locally unique identifier.

- If the **Vocabulary** value is (**VocSource**, **VocValue**), add the following DC-TEXT fragment:

```

Description (
  ResourceId ( VocID )
  Statement (
    PropertyURI ( lom:source )
    LiteralValueString ( VocSource )
  )
  Statement (
    PropertyURI ( lom:value )
    LiteralValueString ( VocValue )
  )
)

```

This convention cannot be used for LOM element 7.1 Relation.Kind.

### “Multiplicity” column

When the LOM element has “Size” equal to 1, this column has the content “-”.

When the LOM element has “Size” other than “1”, this column describes how repeated elements are represented. “Repeated Statements” means that the Statement component in the DC-TEXT fragment should be repeated for each occurrence of the LOM element.

### The translation table

LOM element	DC-TEXT representation	Multiplicity	Notes
<b>1. General</b>	N/A	-	
<b>1.1 Identifier</b>	<pre> Description (   ResourceId ( LO )   Statement (     PropertyURI ( lom:identifier )     ValueId ( ID )   ) ) </pre>	Repeated statements	The resource <i>ID</i> is further described in a separate Description
<b>1.1.1 Catalog</b>	<pre> Description (   ResourceId ( ID )   Statement (     PropertyURI ( lom:catalog )     LiteralValueString ( "Value" )   ) ) </pre>	-	<i>ID</i> is the resource identified in the representation of the parent <b>1.1 Identifier</b> LOM element.  <i>Value</i> is a CharacterString.
<b>1.1.2 Entry</b>	<pre> Description (   ResourceId ( ID )   Statement (     PropertyURI ( lom:entry )     LiteralValueString ( "Value" )   ) ) </pre>	-	<i>ID</i> is the resource identified in the representation of the parent <b>1.1 Identifier</b> LOM element.  <i>Value</i> is a CharacterString.
<b>1.2 Title</b>	<p>For each (<b>String</b>, <b>Language</b>) pair in <i>Value</i>,</p> <pre> Description (   ResourceId ( LO )   Statement (     PropertyURI ( dcterms:title )     LiteralValueString ( "String"       Language ( Language ) )   ) ) </pre>	-	<i>Value</i> is a LangString.
<b>1.3 Language</b>	<pre> Description (   ResourceId ( LO )   Statement (     PropertyURI ( dcterms:language )     ValueString ( "Value"       SyntaxEncodingSchemeURI ( dcterms:RFC4646 )     )   ) ) </pre>	Repeated statements	<i>Value</i> is a language code according to RFC 1766.

LOM element	DC-TEXT representation	Multiplicity	Notes
<b>1.4 Description</b>	<p>If <b>Value</b> contains the pairs (<i>String</i><sub>1</sub>, <i>Language</i><sub>1</sub>) to (<i>String</i><sub>n</sub>, <i>Language</i><sub>n</sub>), then</p> <pre> Description (   ResourceId ( LO )   Statement (     PropertyURI ( dcterms:description )     ValueString ( <i>String</i><sub>1</sub>       Language ( <i>Language</i><sub>1</sub> ) )     [...]     ValueString ( <i>String</i><sub>n</sub>       Language ( <i>Language</i><sub>n</sub> ) )   ) )</pre>	Repeated statements	<i>Value</i> is a LangString.
<b>1.5 Keyword</b>	<p>If <b>Value</b> contains the pairs (<i>String</i><sub>1</sub>, <i>Language</i><sub>1</sub>) to (<i>String</i><sub>n</sub>, <i>Language</i><sub>n</sub>), then</p> <pre> Description (   ResourceId ( LO )   Statement (     PropertyURI ( lom:keyword )     ValueString ( <i>String</i><sub>1</sub>       Language ( <i>Language</i><sub>1</sub> ) )     [...]     ValueString ( <i>String</i><sub>n</sub>       Language ( <i>Language</i><sub>n</sub> ) )   ) )</pre>	Repeated statements	<i>Value</i> is a LangString.
<b>1.6 Coverage</b>	<p>If <b>Value</b> contains the pairs (<i>String</i><sub>1</sub>, <i>Language</i><sub>1</sub>) to (<i>String</i><sub>n</sub>, <i>Language</i><sub>n</sub>), then</p> <pre> Description (   ResourceId ( LO )   Statement (     PropertyURI ( dcterms:coverage )     ValueString ( <i>String</i><sub>1</sub>       Language ( <i>Language</i><sub>1</sub> ) )     [...]     ValueString ( <i>String</i><sub>n</sub>       Language ( <i>Language</i><sub>n</sub> ) )   ) )</pre>	Repeated statements	<i>Value</i> is a LangString.

LOM element	DC-TEXT representation	Multiplicity	Notes
<b>1.7 Structure</b>	<p>If <b>VocURI</b> is a URI identifying <b>Value</b>,</p> <pre> Description (   ResourceId ( LO )   Statement (     PropertyURI ( lom:structure )     ValueURI ( VocURI )   ) )</pre>	-	<p><b>Value</b> is a Vocabulary.</p> <p>Section AAA provides URIs for all vocabularies defined by the LOM standard.</p> <p>If there is no known URI identifying <b>Value</b>, the representation in Section ZZZ may be used.</p>
<b>1.8 Aggregation level</b>	<p>If <b>VocURI</b> is a URI identifying <b>Value</b>,</p> <pre> Description (   ResourceId ( LO )   Statement (     PropertyURI ( lom:aggregationLevel )     ValueURI ( VocURI )   ) )</pre>	-	<p><b>Value</b> is a Vocabulary.</p> <p>Section AAA provides URIs for all vocabularies defined by the LOM standard.</p> <p>If there is no known URI identifying <b>Value</b>, the representation in Section ZZZ may be used.</p>
<b>2 Lifecycle</b>	N/A	-	
<b>2.1 Version</b>	<p>If <b>Value</b> contains the pairs (<b>String<sub>1</sub></b>, <b>Language<sub>1</sub></b>) to (<b>String<sub>n</sub></b>, <b>Language<sub>n</sub></b>), then</p> <pre> Description (   ResourceId ( LO )   Statement (     PropertyURI ( lom:version )     ValueString ( String<sub>1</sub>       Language ( Language<sub>1</sub> ) )      [...]      ValueString ( String<sub>n</sub>       Language ( Language<sub>n</sub> ) )   ) )</pre>	-	<b>Value</b> is a LangString.
<b>2.2 Status</b>	<p>If <b>VocURI</b> is a URI identifying <b>Value</b>,</p> <pre> Description (   ResourceId ( LO )   Statement (     PropertyURI ( lom:status )     ValueURI ( VocURI )   ) )</pre>	-	<p><b>Value</b> is a Vocabulary.</p> <p>Section AAA provides URIs for all vocabularies defined by the LOM standard.</p> <p>If there is no known URI identifying <b>Value</b>, the representation in Section ZZZ may be used.</p>

LOM element	DC-TEXT representation	Multiplicity	Notes
<b>2.3 Contribute</b>	<pre> Description (   ResourceId ( LO )   Statement (     PropertyURI ( lom:contribution )     ValueId ( CN )   ) ) </pre>	Repeated statements	<p>The resource <i>CN</i> is further described in a separate Description</p> <p>Ordering is not preserved.</p>
<b>2.3.1 Role</b>	<p>If <b>VocURI</b> is a URI identifying <b>Value</b>,</p> <pre> Description (   ResourceId ( CN )   Statement (     PropertyURI ( lom:role )     ValueURI ( VocURI )   ) ) </pre>	-	<p><i>CN</i> is the resource identified in the representation of the parent <b>2.3 Contribute</b> LOM element.</p> <p><b>Value</b> is a Vocabulary.</p> <p>Section AAA provides URIs for all vocabularies defined by the LOM standard.</p> <p>If there is no known URI identifying <b>Value</b>, the representation in Section ZZZ may be used.</p>
<b>2.3.2 Entity</b>	<pre> Description (   ResourceId ( CN )   Statement (     PropertyURI ( lom:entity )     LiteralValueString ( "Value"       SyntaxEncodingSchemeURI ( lom:VCard )     )   ) ) </pre>	Repeated statements	<p><i>CN</i> is the resource identified in the representation of the parent <b>2.3 Contribute</b> LOM element.</p> <p><b>Value</b> is a VCARD.</p> <p>Ordering is not preserved.</p>

LOM element	DC-TEXT representation	Multiplicity	Notes
<b>2.3.3 Date</b>	<p>If <b>Value</b> = (<b>Date</b>, <b>Description</b>), and the LangString <b>Description</b> contains the pairs (<b>String</b><sub>1</sub>, <b>Language</b><sub>1</sub>) to (<b>String</b><sub>n</sub>, <b>Language</b><sub>n</sub>), then</p> <pre> Description (   ResourceId ( CN )   Statement (     PropertyURI ( dcterms:date )     LiteralValueString ( "Date"       SyntaxEncodingSchemeURI ( dcterms:W3CDTF ) )   )   Statement (     PropertyURI ( dcterms:date )     LiteralValueString ( "String<sub>1</sub>"       Language ( Language<sub>1</sub> ) )   )   [...]   Statement (     PropertyURI ( dcterms:date )     LiteralValueString ( "String<sub>n</sub>"       Language ( Language<sub>n</sub> ) )   ) )</pre>	-	<p><b>CN</b> is the resource identified in the representation of the parent <b>2.3 Contribute</b> LOM element.</p> <p><b>Value</b> is a DateTime.</p>
<b>3 Metametadata</b>	N/A	-	All elements in category <b>3 Metametadata</b> apply to the metadata resource <b>MD</b> , not to the learning object
<b>3.1 Identifier</b>	<p>As <b>1.1 Identifier</b>, but with</p> <pre> ResourceId ( MD )</pre>	Repeated statements	
<b>3.2 Contribute</b>	<p>As <b>2.3 Contribute</b>, but with</p> <pre> ResourceId ( MD )</pre>	Repeated statements	<p>For the <b>3.2.1 Role</b> element, not all LOM vocabulary values are applicable.</p> <p>Ordering is not preserved.</p>
<b>3.3 Metadata Scheme</b>	<p>If <b>VocURI</b> is a URI identifying <b>Value</b>,</p> <pre> Description (   ResourceId ( MD )   Statement (     PropertyURI ( lom:metadataScheme )     ValueURI ( VocURI )   ) )</pre>	Repeated statements	<p><b>Value</b> is a Vocabulary.</p> <p>Section AAA provides URIs for all vocabularies defined by the LOM standard.</p> <p>If there is no known URI identifying <b>Value</b>, the representation in Section ZZZ may be used.</p>



LOM element	DC-TEXT representation	Multiplicity	Notes
<b>3.4 Language</b>	As 1.3 <b>Language</b> , but with  ResourceId ( MD )	-	The LOM definition of this element states that the value of this element is used to specify a default value for all language elements in a metadata record.  Depending on this behavior in Dublin Core metadata can lead to interoperability issues, and is not recommended.  Instead, all language elements should be populated where appropriate.
<b>4 Technical</b>	N/A	-	
<b>4.1 Format</b>	Description ( ResourceId ( LO ) Statement ( PropertyURI ( dcterms:format ) VocabularyEncodingSchemeURI ( dcterms:IMT ) ValueString ( <b>Value</b> ) ) )	Repeated statements	<b>Value</b> is a MIME type.  If <b>Value</b> = “non-digital”, no Vocabulary Encoding Scheme should be given, as this is not a valid MIME type.
<b>4.2 Size</b>	Description ( ResourceId ( LO ) Statement ( ValueId ( EX ) PropertyURI ( dcterms:extent ) ValueString ( <b>Value</b> ) SyntaxEncodingSchemeURI ( xsd:positiveInteger ) ) ) )  Description ( ResourceId ( EX ) Statement ( PropertyURI ( rdf:type ) ValueURI ( lom:Size ) ) ) )	-	<b>Value</b> is a positive integer.
<b>4.3 Location</b>	Description ( ResourceId ( LO ) Statement ( PropertyURI ( lom:location ) ValueString ( <b>Value</b> ) SyntaxEncodingSchemeURI ( xsd:anyURI ) ) ) )	Repeated statements	<b>Value</b> is a URI.  Ordering is not preserved.

LOM element	DC-TEXT representation	Multiplicity	Notes
<b>4.4 Requirement</b>	<pre> Description (   ResourceId ( LO )   Statement (     ValueId ( RQ )     PropertyURI ( lom:requirement )   ) ) </pre>	Repeated statements	The resource <i>RQ</i> is further described in a separate Description
<b>4.4.1 OrComposite</b>	<pre> Description (   ResourceId ( RQ )   Statement (     ValueId ( AltRQ )     PropertyURI ( lom:alternativeRequirement )   ) ) </pre>	Repeated statements	<p><i>RQ</i> is the resource identified in the representation of the parent <b>4.4 Requirement</b> LOM element.</p> <p>The resource <i>AltRQ</i> is further described in a separate Description</p>
<b>4.4.1.1 Type</b>	<p>If <b>VocURI</b> is a URI identifying <b>Value</b>,</p> <pre> Description (   ResourceId ( AltRQ )   Statement (     PropertyURI ( rdf:type )     ValueURI ( VocURI )   ) ) </pre>	-	<p><i>AltRQ</i> is the resource identified in the representation of the parent <b>4.4.1 OrComposite</b> LOM element.</p> <p><b>Value</b> is a Vocabulary.</p> <p>Section AAA provides URIs for all vocabularies defined by the LOM standard.</p> <p>If there is no known URI identifying <b>Value</b>, the representation in Section ZZZ may be used.</p>
<b>4.4.1.2 Name</b>	<p>If <b>VocURI</b> is a URI identifying <b>Value</b>,</p> <pre> Description (   ResourceId ( AltRQ )   Statement (     PropertyURI ( lom:technology )     ValueURI ( VocURI )   ) ) </pre>	-	<p><i>AltRQ</i> is the resource identified in the representation of the parent <b>4.4.1 OrComposite</b> LOM element.</p> <p><b>Value</b> is a Vocabulary.</p> <p>Section AAA provides URIs for all vocabularies defined by the LOM standard.</p> <p>If there is no known URI identifying <b>Value</b>, the representation in Section ZZZ may be used.</p>
<b>4.4.1.3 Minimum version</b>	<pre> Description (   ResourceId ( AltRQ )   Statement (     PropertyURI ( lom:minimumVersion )     LiteralValueString ( Value )   ) ) </pre>	-	<p><i>AltRQ</i> is the resource identified in the representation of the parent <b>4.4.1 OrComposite</b> LOM element.</p> <p><b>Value</b> is a version string.</p>

LOM element	DC-TEXT representation	Multiplicity	Notes
<b>4.4.1.4 Maximum version</b>	<pre> Description (   ResourceId ( <i>AltRQ</i> )   Statement (     PropertyURI ( lom:maximumVersion )     LiteralValueString ( <i>Value</i> )   ) ) </pre>	-	<p><i>AltRQ</i> is the resource identified in the representation of the parent <b>4.4.1OrComposite</b> LOM element.</p> <p><i>Value</i> is a version string.</p>
<b>4.5 Installation Remarks</b>	<p>If <i>Value</i> contains the pairs (<i>String<sub>1</sub></i>, <i>Language<sub>1</sub></i>) to (<i>String<sub>n</sub></i>, <i>Language<sub>n</sub></i>), then</p> <pre> Description (   ResourceId ( <i>LO</i> )   Statement (     PropertyURI ( lom:installationRemarks )     ValueString ( <i>String<sub>1</sub></i>       Language ( <i>Language<sub>1</sub></i> ) )     [...]     ValueString ( <i>String<sub>n</sub></i>       Language ( <i>Language<sub>n</sub></i> ) )   ) ) </pre>	-	<i>Value</i> is a LangString.
<b>4.6 Other Platform Requirements</b>	<p>If <i>Value</i> contains the pairs (<i>String<sub>1</sub></i>, <i>Language<sub>1</sub></i>) to (<i>String<sub>n</sub></i>, <i>Language<sub>n</sub></i>), then</p> <pre> Description (   ResourceId ( <i>LO</i> )   Statement (     PropertyURI ( lom:otherPlatformRequirements )     ValueString ( <i>String<sub>1</sub></i>       Language ( <i>Language<sub>1</sub></i> ) )     [...]     ValueString ( <i>String<sub>n</sub></i>       Language ( <i>Language<sub>n</sub></i> ) )   ) ) </pre>	-	<i>Value</i> is a LangString.

LOM element	DC-TEXT representation	Multiplicity	Notes
<b>4.7 Duration</b>	<p>If <b>Value</b> = (<i>Duration</i>, <i>Description</i>), and the LangString <i>Description</i> contains the pairs (<i>String<sub>i</sub></i>, <i>Language<sub>i</sub></i>) to (<i>String<sub>n</sub></i>, <i>Language<sub>n</sub></i>), then</p> <pre> Description (   ResourceId ( LO )   Statement (     PropertyURI ( dcterms:extent )     ValueString ( "Duration"       SyntaxEncodingSchemeURI ( xsd:duration )      ValueString ( "String<sub>i</sub>"       Language ( Language<sub>i</sub> ) )      [...]      ValueString ( "String<sub>n</sub>"       Language ( Language<sub>n</sub> ) )   ) )</pre>	-	<i>Value</i> is a Duration.
<b>5 Educational</b>	N/A	-	Multiple instances of this category are not supported.
<b>5.1 Interactivity Type</b>	<p>If <b>VocURI</b> is a URI identifying <b>Value</b>,</p> <pre> Description (   ResourceId ( LO )   Statement (     PropertyURI ( lom:interactivityType )     ValueURI ( VocURI )   ) )</pre>	-	<p><i>Value</i> is a Vocabulary.</p> <p>Section AAA provides URIs for all vocabularies defined by the LOM standard.</p> <p>If there is no known URI identifying <i>Value</i>, the representation in Section ZZZ may be used.</p>
<b>5.2 Learning Resource Type</b>	<p>If <b>VocURI</b> is a URI identifying <b>Value</b>,</p> <pre> Description (   ResourceId ( LO )   Statement (     PropertyURI ( rdf:type )     ValueURI ( VocURI )   ) )</pre>	Repeated statements	<p><i>Value</i> is a Vocabulary.</p> <p>Ordering is not preserved.</p> <p>Section AAA provides URIs for all vocabularies defined by the LOM standard.</p> <p>If there is no known URI identifying <i>Value</i>, the representation in Section ZZZ may be used.</p>

LOM element	DC-TEXT representation	Multiplicity	Notes
<b>5.3 Interactivity Level</b>	<p>If <b>VocURI</b> is a URI identifying <b>Value</b>,</p> <pre> Description (   ResourceId ( LO )   Statement (     PropertyURI ( lom:interactivityLevel )     ValueURI ( VocURI )   ) )</pre>	-	<p><b>Value</b> is a Vocabulary.</p> <p>Section AAA provides URIs for all vocabularies defined by the LOM standard.</p> <p>If there is no known URI identifying <b>Value</b>, the representation in Section ZZZ may be used.</p>
<b>5.4 Semantic Density</b>	<p>If <b>VocURI</b> is a URI identifying <b>Value</b>,</p> <pre> Description (   ResourceId ( LO )   Statement (     PropertyURI ( lom:semanticDensity )     ValueURI ( VocURI )   ) )</pre>	-	<p><b>Value</b> is a Vocabulary.</p> <p>Section AAA provides URIs for all vocabularies defined by the LOM standard.</p> <p>If there is no known URI identifying <b>Value</b>, the representation in Section ZZZ may be used.</p>
<b>5.5 Intended End User Role</b>	<p>If <b>VocURI</b> is a URI identifying <b>Value</b>,</p> <pre> Description (   ResourceId ( LO )   Statement (     PropertyURI ( dcterms:audience )     ValueURI ( VocURI )   ) )</pre>	Repeated statements	<p><b>Value</b> is a Vocabulary.</p> <p>Section AAA provides URIs for all vocabularies defined by the LOM standard.</p> <p>If there is no known URI identifying <b>Value</b>, the representation in Section ZZZ may be used.</p>
<b>5.6 Context</b>	<p>If <b>VocURI</b> is a URI identifying <b>Value</b>,</p> <pre> Description (   ResourceId ( LO )   Statement (     PropertyURI ( lom:context )     ValueURI ( VocURI )   ) )</pre>	Repeated statements	<p><b>Value</b> is a Vocabulary.</p> <p>Section AAA provides URIs for all vocabularies defined by the LOM standard.</p> <p>If there is no known URI identifying <b>Value</b>, the representation in Section ZZZ may be used.</p>

LOM element	DC-TEXT representation	Multiplicity	Notes
<b>5.7 Typical Age Range</b>	<p>If <b>Value</b> contains the pairs (<i>String<sub>1</sub></i>, <i>Language<sub>1</sub></i>) to (<i>String<sub>n</sub></i>, <i>Language<sub>n</sub></i>), then</p> <pre> Description (   ResourceId ( LO )   Statement (     PropertyURI ( lom:typicalAgeRange )     ValueString ( <i>String<sub>1</sub></i>       Language ( <i>Language<sub>1</sub></i> ) )     [...]     ValueString ( <i>String<sub>n</sub></i>       Language ( <i>Language<sub>n</sub></i> ) )   ) )</pre>	Repeated statements	
<b>5.8 Difficulty</b>	<p>If <b>VocURI</b> is a URI identifying <b>Value</b>,</p> <pre> Description (   ResourceId ( LO )   Statement (     PropertyURI ( lom:difficulty )     ValueURI ( <i>VocURI</i> )   ) )</pre>	-	<p><b>Value</b> is a Vocabulary.</p> <p>Section AAA provides URIs for all vocabularies defined by the LOM standard.</p> <p>If there is no known URI identifying <b>Value</b>, the representation in Section ZZZ may be used.</p>
<b>5.9 Typical Learning Time</b>	<p>If <b>Value</b> = (<i>Duration</i>, <i>Description</i>), and the LangString <i>Description</i> contains the pairs (<i>String<sub>1</sub></i>, <i>Language<sub>1</sub></i>) to (<i>String<sub>n</sub></i>, <i>Language<sub>n</sub></i>), then</p> <pre> Description (   ResourceId ( LO )   Statement (     PropertyURI ( lom:typicalLearningTime )     ValueString ( "<i>Duration</i>"       SyntaxEncodingSchemeURI ( xsd:duration )      ValueString ( <i>String<sub>1</sub></i>       Language ( <i>Language<sub>1</sub></i> ) )      [...]     ValueString ( <i>String<sub>n</sub></i>       Language ( <i>Language<sub>n</sub></i> ) )   ) )</pre>	-	<b>Value</b> is a Duration.

LOM element	DC-TEXT representation	Multiplicity	Notes
<b>5.10 Description</b>	<p>If <b>Value</b> contains the pairs (<i>String</i><sub>1</sub>, <i>Language</i><sub>1</sub>) to (<i>String</i><sub>n</sub>, <i>Language</i><sub>n</sub>), then</p> <pre> Description (   ResourceId ( LO )   Statement (     PropertyURI ( lom:educationalDescription )     ValueString ( <i>String</i><sub>1</sub>       Language ( <i>Language</i><sub>1</sub> ) )     [...]     ValueString ( <i>String</i><sub>n</sub>       Language ( <i>Language</i><sub>n</sub> ) )   ) )</pre>	Repeated Properties	<b>Value</b> is a LangString.
<b>5.11 Language</b>	<pre> Description (   ResourceId ( LO )   Statement (     PropertyURI ( lom:educationalLanguage )     ValueString ( "<b>Value</b>"       SyntaxEncodingSchemeURI ( dcterms:RFC4646 )     )   ) )</pre>	Repeated properties	<b>Value</b> is a language code according to RFC 1766.
<b>6 Rights</b>	N/A	-	
<b>6.1 Cost</b>	<p>With <b>Cost</b> = "true" if <b>Value</b> = ( <i>LOMv1.0</i>, yes ), and <b>Cost</b> = "false" if <b>Value</b> = ( <i>LOMv1.0</i>, no ),</p> <pre> Description (   ResourceId ( LO )   Statement (     PropertyURI ( lom:cost )     LiteralValueString ( <b>Cost</b>       SyntaxEncodingSchemeURI ( xsd:boolean )     )   ) )</pre>	-	<b>Value</b> is either ( <i>LOMv1.0</i> , yes ), or ( <i>LOMv1.0</i> , no ),

LOM element	DC-TEXT representation	Multiplicity	Notes
<b>6.2 Copyright and Other Restrictions</b>	<p>With <b>CoR</b> = "true" if <b>Value</b> = ( <i>LOMv1.0</i>, yes ), and <b>CoR</b> = "false" if <b>Value</b> = ( <i>LOMv1.0</i>, no ),</p> <pre> Description (   ResourceId ( LO )   Statement (     PropertyURI ( lom:copyrightAndOtherRestrictions )     LiteralValueString ( <b>CoR</b>       SyntaxEncodingSchemeURI ( xsd:boolean )     )   ) )</pre>	-	<b>Value</b> is either ( <i>LOMv1.0</i> , yes ), or ( <i>LOMv1.0</i> , no ),
<b>6.3 Description</b>	<p>If <b>Value</b> contains the pairs ( <i>String<sub>1</sub></i>, <i>Language<sub>1</sub></i> ) to ( <i>String<sub>n</sub></i>, <i>Language<sub>n</sub></i> ), then</p> <pre> Description (   ResourceId ( LO )   Statement (     PropertyURI ( dcterms:rights )     ValueString ( <b>String<sub>1</sub></b>       Language ( <b>Language<sub>1</sub></b> ) )      [...]      ValueString ( <b>String<sub>n</sub></b>       Language ( <b>Language<sub>n</sub></b> ) )   ) )</pre>	-	<b>Value</b> is a LangString.
<b>7 Relation</b>	See 7.1 Kind	Repeated statements in the expression of 7.1 Kind,	
<b>7.1 Kind</b>	<p>If <b>RelURI</b> is a URI identifying <b>Value</b>,</p> <pre> Description (   ResourceId ( LO )   Statement (     PropertyURI ( <b>RelURI</b> )     ValueId ( RES )   ) )</pre>	-	<p><b>Value</b> is a Vocabulary.</p> <p>Section AAA provides URIs for all vocabularies defined by the LOM standard.</p> <p>If there is no known URI identifying <b>Value</b>, the element cannot be represented.</p> <p><i>RES</i> is the related learning object, described in a separate Description.</p>
<b>7.2 Resource</b>	N/A	-	



LOM element	DC-TEXT representation	Multiplicity	Notes
<b>7.2.1 Identifier</b>	As <b>1.1 Identifier</b> , but with ResourceId ( <i>RES</i> )	-	<i>RES</i> is the resource identified in the representation of the corresponding <b>7.1 Kind</b> LOM element.
<b>7.2.2 Description</b>	As <b>1.4 Description</b> , but with ResourceId ( <i>RES</i> )	-	<i>RES</i> is the resource identified in the representation of the corresponding <b>7.1 Kind</b> LOM element.
<b>8 Annotation</b>	Description ( ResourceId ( <i>LO</i> ) Statement ( PropertyURI ( lom:annotation ) ValueId ( <i>AN</i> ) ) )	Repeated statements	The resource <i>AN</i> is further described in a separate Description
<b>8.1 Entity</b>	Description ( ResourceId ( <i>AN</i> ) Statement ( PropertyURI ( lom:entity ) LiteralValueString ( " <i>Value</i> " SyntaxEncodingSchemeURI ( lom:VCard ) ) )	-	<i>AN</i> is the resource identified in the representation of the parent <b>8 Annotation</b> LOM element.  <i>Value</i> is a VCARD.
<b>8.2 Date</b>	If <i>Value</i> = ( <i>Date</i> , <i>Description</i> ), and the LangString <i>Description</i> contains the pairs ( <i>String</i> <sub>1</sub> , <i>Language</i> <sub>1</sub> ) to ( <i>String</i> <sub><i>n</i></sub> , <i>Language</i> <sub><i>n</i></sub> ), then  Description ( ResourceId ( <i>AN</i> ) Statement ( PropertyURI ( dcterms:date ) LiteralValueString ( " <i>Date</i> " SyntaxEncodingSchemeURI ( dcterms:W3CDTF ) ) Statement ( PropertyURI ( dcterms:date ) LiteralValueString ( " <i>String</i> <sub>1</sub> " Language ( <i>Language</i> <sub>1</sub> ) ) ) [...] Statement ( PropertyURI ( dcterms:date ) LiteralValueString ( " <i>String</i> <sub><i>n</i></sub> " Language ( <i>Language</i> <sub><i>n</i></sub> ) ) ) )	-	<i>AN</i> is the resource identified in the representation of the parent <b>8 Annotation</b> LOM element.  <i>Value</i> is a DateTime.

LOM element	DC-TEXT representation	Multiplicity	Notes
<b>8.3 Description</b>	As <b>1.4 Description</b> , but with  ResourceId ( <i>AN</i> )	-	<i>AN</i> is the resource identified in the representation of the parent <b>8 Annotation</b> LOM element.
<b>9 Classification</b>	Description ( ResourceId ( <i>LO</i> ) Statement ( PropertyURI ( lom:classification ) ValueId ( <i>CLN</i> ) ) )	Repeated statements	The resource <i>CLN</i> is further described in a separate Description
<b>9.1 Purpose</b>	If <b>VocURI</b> is a URI identifying <b>Value</b> ,  Description ( ResourceId ( <i>CLN</i> ) Statement ( PropertyURI ( lom:purpose ) ValueURI ( <b>VocURI</b> ) ) )	-	<i>CLN</i> is the resource identified in the representation of the parent <b>9 Classification</b> LOM element.  <i>Value</i> is a Vocabulary.  Section AAA provides URIs for all vocabularies defined by the LOM standard.  If there is no known URI identifying <i>Value</i> , the representation in Section ZZZ may be used.
<b>9.2 TaxonPath</b>	Description ( ResourceId ( <i>CLN</i> ) Statement ( PropertyURI ( lom:taxonPath ) ValueId ( <i>TXP</i> ) ) )	Repeated statements	<i>CLN</i> is the resource identified in the representation of the parent <b>9 Classification</b> LOM element.  The resource <i>TXP</i> is further described in a separate Description
<b>9.2.1 Source</b>	If <b>Value</b> contains the pairs ( <i>String</i> <sub>1</sub> , <i>Language</i> <sub>1</sub> ) to ( <i>String</i> <sub>n</sub> , <i>Language</i> <sub>n</sub> ), then  Description ( ResourceId ( <i>TXP</i> ) Statement ( PropertyURI ( lom:taxonSource ) ValueString ( <i>String</i> <sub>1</sub> Language ( <i>Language</i> <sub>1</sub> ) )  [...]  ValueString ( <i>String</i> <sub>n</sub> Language ( <i>Language</i> <sub>n</sub> ) ) ) )	-	<i>TXP</i> is the resource identified in the representation of the parent <b>9.2 TaxonPath</b> LOM element.  <i>Value</i> is a LangString.

LOM element	DC-TEXT representation	Multiplicity	Notes
<b>9.2.2 Taxon</b>	<p>If <b>Value</b> contains the taxons <b>Taxon<sub>1</sub> ... Taxon<sub>n</sub></b>,</p> <pre> Description (   ResourceId ( TXP )   Statement (     PropertyURI ( rdf:_1 )     ValueId ( TN<sub>1</sub> )   )   [...]   Statement (     PropertyURI ( rdf:_n )     ValueId ( TN<sub>n</sub> )   ) )</pre>	Repeated statements	<p><i>TXP</i> is the resource identified in the representation of the parent <b>9.2 TaxonPath</b> LOM element.</p> <p>The resources <i>TN<sub>1</sub> ... TN<sub>n</sub></i> are further described in a separate Description</p>
<b>9.2.2.1 Id</b>	<pre> Description (   ResourceId ( TN )   Statement (     PropertyURI ( dcterms:identifier )     LiteralValueString ( "Value" )   ) )</pre>	-	<i>TN</i> is the resource identified in the representation of the parent <b>9.2.2 Taxon</b> LOM element.
<b>9.2.2.2 Entry</b>	<pre> Description (   ResourceId ( TN )   Statement (     PropertyURI ( rdfs:label )     LiteralValueString ( "Value" )   ) )</pre>	-	<i>TN</i> is the resource identified in the representation of the parent <b>9.2 Taxon</b> LOM element.
<b>9.3 Description</b>	<p>As <b>1.4 Description</b>, but with</p> <pre> ResourceId ( CLN )</pre>	-	<i>CLN</i> is the resource identified in the representation of the parent <b>9 Classification</b> LOM element.
<b>9.4 Keyword</b>	<p>As <b>1.5 Keyword</b>, but with</p> <pre> ResourceId ( CLN )</pre>	Repeated Properties	<p><i>CLN</i> is the resource identified in the representation of the parent <b>9 Classification</b> LOM element.</p> <p>Ordering is not preserved.</p>

## Annex A

(normative)

### URIs for LOM vocabulary terms

#### LOM element 1.7 Structure

Value	URI
atomic	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Structure-atomic">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Structure-atomic</a>
collection	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Structure-collection">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Structure-collection</a>
networked	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Structure-networked">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Structure-networked</a>
hierarchical	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Structure-hierarchical">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Structure-hierarchical</a>
linear	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Structure-linear">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Structure-linear</a>

#### LOM element 1.8 Aggregation Level

Value	URI
1	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#AggregationLevel-1">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#AggregationLevel-1</a>
2	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#AggregationLevel-2">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#AggregationLevel-2</a>
3	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#AggregationLevel-3">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#AggregationLevel-3</a>
4	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#AggregationLevel-4">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#AggregationLevel-4</a>

#### LOM element 2.2 Status

Value	URI
draft	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Status-draft">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Status-draft</a>
final	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Status-final">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Status-final</a>
revised	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Status-revised">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Status-revised</a>
unavailable	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Status-unavailable">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Status-unavailable</a>

#### LOM element 2.3.1 Role and 3.2.1 Role

NOTE – Only “creator” and “validator” may be used with LOM element 3.2.1 Role

Value	URI
author	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-author">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-author</a>
publisher	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-publisher">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-publisher</a>
unknown	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-unknown">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-unknown</a>
initiator	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-initiator">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-initiator</a>
terminator	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-terminator">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-terminator</a>
validator	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-validator">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-validator</a>
editor	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-editor">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-editor</a>
graphical designer	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-graphicalDesigner">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-graphicalDesigner</a>
technical implementer	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-technicalImplementer">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-technicalImplementer</a>
content provider	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-contentProvider">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-contentProvider</a>
technical validator	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-technicalValidator">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-technicalValidator</a>
educational validator	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-educationalValidator">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-educationalValidator</a>
script writer	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-scriptWriter">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-scriptWriter</a>
instructional designer	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-instructionalDesigner">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-instructionalDesigner</a>
subject matter expert	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-subjectMatterExpert">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Role-subjectMatterExpert</a>

### LOM element 3.3 Metadata Scheme

Value	URI
LOMv1.0	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#MetadataScheme-LOMv1.0">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#MetadataScheme-LOMv1.0</a>

### LOM element 4.4.1.1 Type

Value	URI
operating system	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#RequirementType-operatingSystem">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#RequirementType-operatingSystem</a>
browser	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#RequirementType-browser">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#RequirementType-browser</a>

### LOM element 4.4.1.2 Name

#### Operating System Technology

Value	URI
pc-dos	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#OperatingSystemTechnology-pc-dos">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#OperatingSystemTechnology-pc-dos</a>
ms-windows	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#OperatingSystemTechnology-ms-windows">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#OperatingSystemTechnology-ms-windows</a>
macos	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#OperatingSystemTechnology-macos">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#OperatingSystemTechnology-macos</a>
unix	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#OperatingSystemTechnology-unix">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#OperatingSystemTechnology-unix</a>
multi-os	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#OperatingSystemTechnology-multi-os">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#OperatingSystemTechnology-multi-os</a>
none	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#OperatingSystemTechnology-none">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#OperatingSystemTechnology-none</a>

#### Browser Technology

Value	URI
any	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#BrowserTechnology-any">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#BrowserTechnology-any</a>
netscape communicator	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#BrowserTechnology-netscapeCommunicator">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#BrowserTechnology-netscapeCommunicator</a>
ms-internet explorer	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#BrowserTechnology-ms-internetExplorer">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#BrowserTechnology-ms-internetExplorer</a>
opera	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#BrowserTechnology-opera">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#BrowserTechnology-opera</a>
amaya	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#BrowserTechnology-amaya">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#BrowserTechnology-amaya</a>

### LOM element 5.1 Interactivity Type

Value	URI
active	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#InteractivityType-active">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#InteractivityType-active</a>
expositive	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#InteractivityType-expositive">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#InteractivityType-expositive</a>
mixed	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#InteractivityType-mixed">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#InteractivityType-mixed</a>

### LOM element 5.2 Learning Resource Type

Value	URI
exercise	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-exercise">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-exercise</a>
simulation	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-simulation">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-simulation</a>
questionnaire	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-questionnaire">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-questionnaire</a>
diagram	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-diagram">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-diagram</a>
figure	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-figure">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-figure</a>
graph	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-graph">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-graph</a>
index	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-index">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-index</a>
slide	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-slide">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-slide</a>
table	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-table">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-table</a>
narrative text	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-narrativeText">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-narrativeText</a>
exam	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-exam">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-exam</a>
experiment	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-experiment">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-experiment</a>
problem statement	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-problemStatement">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-problemStatement</a>
self assessment	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-selfAssessment">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-selfAssessment</a>
lecture	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-lecture">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#LearningResourceType-lecture</a>

### LOM element 5.3 Interactivity Level

Value	URI
very low	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#InteractivityLevel-veryLow">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#InteractivityLevel-veryLow</a>
low	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#InteractivityLevel-low">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#InteractivityLevel-low</a>
medium	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#InteractivityLevel-medium">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#InteractivityLevel-medium</a>
high	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#InteractivityLevel-high">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#InteractivityLevel-high</a>

very high	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#InteractivityLevel-veryHigh">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#InteractivityLevel-veryHigh</a>
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### LOM element 5.4 Semantic Density

Value	URI
very low	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#SemanticDensity-veryLow">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#SemanticDensity-veryLow</a>
low	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#SemanticDensity-low">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#SemanticDensity-low</a>
medium	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#SemanticDensity-medium">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#SemanticDensity-medium</a>
high	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#SemanticDensity-high">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#SemanticDensity-high</a>
very high	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#SemanticDensity-veryHigh">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#SemanticDensity-veryHigh</a>

### LOM element 5.5 Intended End User Role

Value	URI
teacher	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#IntendedEndUserRole-teacher">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#IntendedEndUserRole-teacher</a>
author	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#IntendedEndUserRole-author">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#IntendedEndUserRole-author</a>
learner	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#IntendedEndUserRole-learner">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#IntendedEndUserRole-learner</a>
manager	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#IntendedEndUserRole-manager">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#IntendedEndUserRole-manager</a>

### LOM element 5.6 Context

Value	URI
school	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Context-school">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Context-school</a>
higher education	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Context-higherEducation">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Context-higherEducation</a>
training	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Context-training">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Context-training</a>
other	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Context-other">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Context-other</a>

### LOM element 5.8 Difficulty

Value	URI
very easy	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Difficulty-veryEasy">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Difficulty-veryEasy</a>
easy	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Difficulty-easy">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Difficulty-easy</a>
medium	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Difficulty-medium">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Difficulty-medium</a>
difficult	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Difficulty-difficult">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Difficulty-difficult</a>
very difficult	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Difficulty-veryDifficult">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Difficulty-veryDifficult</a>

### LOM element 7.1 Kind

Value	URI
ispartof	<a href="http://purl.org/dc/terms/isPartOf">http://purl.org/dc/terms/isPartOf</a>
haspart	<a href="http://purl.org/dc/terms/hasPart">http://purl.org/dc/terms/hasPart</a>
isversionof	<a href="http://purl.org/dc/terms/isVersionOf">http://purl.org/dc/terms/isVersionOf</a>
hasversion	<a href="http://purl.org/dc/terms/hasVersion">http://purl.org/dc/terms/hasVersion</a>
isformatof	<a href="http://purl.org/dc/terms/isFormatOf">http://purl.org/dc/terms/isFormatOf</a>
hasformat	<a href="http://purl.org/dc/terms/hasFormat">http://purl.org/dc/terms/hasFormat</a>
references	<a href="http://purl.org/dc/terms/references">http://purl.org/dc/terms/references</a>
isreferencedby	<a href="http://purl.org/dc/terms/isReferencedBy">http://purl.org/dc/terms/isReferencedBy</a>
isbasedon	<a href="http://purl.org/dc/terms/source">http://purl.org/dc/terms/source</a>
isbasisfor	<a href="http://ltsc.ieee.org/rdf/lomv1p0/terms#isBasisFor">http://ltsc.ieee.org/rdf/lomv1p0/terms#isBasisFor</a>
requires	<a href="http://purl.org/dc/terms/requires">http://purl.org/dc/terms/requires</a>
isrequiredby	<a href="http://purl.org/dc/terms/isRequiredBy">http://purl.org/dc/terms/isRequiredBy</a>

## LOM element 9.1 Purpose

Value	URI
discipline	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Purpose-discipline">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Purpose-discipline</a>
idea	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Purpose-idea">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Purpose-idea</a>
prerequisite	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Purpose-prerequisite">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Purpose-prerequisite</a>
educationalObjective	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Purpose-educationalObjective">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Purpose-educationalObjective</a>
accessibility restrictions	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Purpose-accessibilityRestrictions">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Purpose-accessibilityRestrictions</a>
educationalLevel	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Purpose-educationalLevel">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Purpose-educationalLevel</a>
skillLevel	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Purpose-skillLevel">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Purpose-skillLevel</a>
securityLevel	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Purpose-securityLevel">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Purpose-securityLevel</a>
competency	<a href="http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Purpose-competency">http://ltsc.ieee.org/rdf/lomv1p0/vocabulary#Purpose-competency</a>