INTERNATIONAL STANDARD

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Information technology — Learning, education and training — Metadata for learning resources —

Part 4:
Technical elements

Technologies de l'information — Apprentissage, éducation et formation — Métadonnées pour ressources d'apprentissage — Partie 4: Éléments techniques

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 19788-4 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 36, *Information technology for learning, education and training*.

ISO/IEC 19788 consists of the following parts, under the general title *Information technology — Learning, education and training — Metadata for learning resources*:

— *Part 1: Framework*

— *Part 2: Dublin Core elements*

— *Part 3: Basic application profile*

— *Part 4: Technical elements*

— *Part 5: Educational elements*

— *Part 6: Availability, distribution, and intellectual property elements*

— *Part 8: Data elements for MLR records*

— *Part 9: Data elements for Persons*

The following files are under preparation:

— *Part 7: Bindings*

— *Part 10: Application profile for access, distribution and intellectual property (WIPO compliant) elements*

— *Part 11: Migration from LOM to MLR*

Introduction

Overall purpose of this International Standard

The primary purpose of this International Standard is to facilitate: (1) the description of a learning resource by providing a standards-based approach to the identification and specification of the metadata elements required to describe a learning resource, e.g. as a metadata learning resource (MLR) record; and (2) the search, discovery, acquisition, evaluation, and use of learning resources, for instance by learners, instructors, or automated software processes. The interoperability of these functions can be achieved through harvesting or federated search processes, among other technologies and solutions. This International Standard is based on identified user requirements.

This International Standard has a modular structure with all subsequent parts corresponding to a specified set of user requirements for the identification and specification of metadata elements having a particular focus and intended use in the description of a learning resource. This includes categories of metadata elements focused on technical perspectives, pedagogical aspects, availability accessibility, and intellectual property aspects, bindings, etc.

Purpose and overview of this part of ISO/IEC 19788

Learning resources, like any others, can have technical characteristics that affect or limit how the resource can be used. These technical metadata elements describing learning resources are illustrated in a conceptual model in Annex B. Some characteristics of significance in educational contexts have not yet been defined in metadata standards. This part of ISO/IEC 19788 defines how such characteristics should be described. These metadata elements can be used in combination with metadata elements from other parts of this International Standard. They can also be used in combination with elements from other metadata specifications, IEEE 1484.12.1-2002 Learning Object Metadata (LOM) or other metadata schemas. More detailed media format can be extracted from the media file(s) for example information about the codec required, bandwidth, resolution, and other technical information.

In particular, metadata elements in this part of ISO/IEC 19788 anticipate technical characteristics for emerging technologies such as tablets and mobile phones. This part of ISO/IEC 19788 metadata elements can be refined, conforming to this International Standard, by particular communities according to their needs.

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Part 4:
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1 Scope

This International Standard specifies, in a rule-based manner, metadata elements and their attributes for the description of learning resources. This includes the rules governing the identification of metadata elements and the specification of metadata attributes.

These metadata elements are used to form the description of a learning resource, i.e. as a metadata learning resource (MLR) record.

This part of ISO/IEC 19788 specifies, using ISO/IEC 19788-1, technical aspects of learning resources, i.e., requirements for use, location, size, etc.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 19788-1:2011 *Information technology — Metadata for Learning Resources (MLR) — Part 1: Framework*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 19788-1:2011 and the following apply.

3.1
attribute
characteristic of an object or entity

[SOURCE: ISO/IEC 19788-1:2011, 3.4]

3.2
attribute value
information recorded as the *attribute* (3.1) in a *data element* (3.4)

[SOURCE: ISO/IEC 19788-1:2011, 3.5]

3.3
content value
information recorded as the content of the *data element* (3.4), in compliance with its *data element specification* (3.5)

[SOURCE: ISO/IEC 19788-1:2011, 3.10]

3.4
data element
unit of data described in a *data element specification* (3.5)

[SOURCE: ISO 9735-1:2002, 4.28]

3.5
data element specification
set of *attributes* (3.1) and *attribute value* (3.2) rules characterizing a set of *data elements* (3.4)

Note 1 to entry: Adapted from the definition of "simple data element specification" in ISO/IEC 9735-1:2002, 4.106.

[SOURCE: ISO/IEC 19788-1:2011, 3.14]

3.6
definition
representation of a concept by a descriptive statement which serves differentiate it from related concepts

[SOURCE: ISO 1087-1:2000, 3.3.1]

3.7
domain
<data element> *resource class* (3.15) whose *resources* (3.14) are described by the *data element* (3.4) under consideration

Note 1 to entry: A central resource class for ISO/IEC 19788 is Learning Resource (the set of all learning resources).

[SOURCE: ISO/IEC 19788-1:2011, 3.16]

3.8
identifier
sequence of characters capable of uniquely identifying an entity

Note 1 to entry: An identifier is linguistically neutral, with no translation provided.

Note 2 to entry: An identifier may be of the nature of a composite identifier, i.e. a unique identifier, consisting of two or more identifiers and/or other data elements, whose inter-workings are rule-based and which together serve as a "single" identifier.

[SOURCE: ISO/IEC 19788-1:2011, 3.19]

3.9
learning resource
resource (3.14) used for learning, education, and training

[SOURCE: ISO/IEC 19788-1:2011, 3.20]

3.10
literal
string representing a value

[SOURCE: ISO/IEC 19788-1:2011, 3.21]

3.11
name
designation of an object by a linguistic expression

[SOURCE: ISO/IEC 11179-1:2004, 3.2.21]

3.12
range
<data element> *resource class* (3.15) to which the *content values* (3.3) of the *data element* (3.4) belong, or set of *literals* (3.10) comprising the string representations of the permissible values of the data element under consideration

[SOURCE: ISO/IEC 19788-1:2011, 3.28]

3.13
refine
<data element specification> have an associated property which is a sub-property of the property associated with

Note 1 to entry: This implies that the value of the domain attribute of the first data element specification is identical or a proper subset of the value of the domain attribute of the second data element specification and that the value of the range attribute of the first data element specification is identical or a proper subset of the value of the range attribute of the second data element specification.

Note 2 to entry: Data element instances of the first data element specification are said refine data element instances of the second data element specification.

EXAMPLE 1   Property "is son of" refines property "is child of".

EXAMPLE 2   Property "has mother" refines property "has parent".

[SOURCE: ISO/IEC 19788-1:2011, 3.29]

3.14
resource
entity that can be identified and referenced by an unambiguous and stable *identifier* (3.8) in a recognized identification system.

[SOURCE: ISO/IEC 19788-1:2011, 3.30]

3.15
resource class
set of *resources* (3.14) that can be identified by listing or description of boundaries and meaning and whose properties and behavior follow the same *rule* (3.16)

Note 1 to entry: A resource class has the following attributes:

— Identifier;

— Name;

— Definition;

— SubclassOf [multiple inheritance];

— Note.

EXAMPLE   *LearningResource* (set of all learning resources), *Person* (set of all Persons), *Rights* (set of all rights objects), and *Document* (set of all documents).

Note 2 to entry: Adapted from the definition of "object class" in ISO/IEC 11179-1:2004, 3.3.22.

[SOURCE: ISO/IEC 19788-1:2011, 3.31]

3.16
rule
statement that specifies a constraint

Note 1 to entry: Rules specify conditions that must be complied with. These can include relations among objects and their attributes.

Note 2 to entry: Rules are of either a mandatory or a conditional nature.

Note 3 to entry: In MLR, rules formally specify and are applied to the conditions governing the content, i.e. in ensuring the precision of the semantics of the data.

Note 4 to entry: Rules is intended to be be explicit and clear enough to be understood by all.

[SOURCE: ISO/IEC 19788-1:2011, 3.32]

3.17
rule set
defined and pre-established set of *rules* (3.16) that are used together

[SOURCE: ISO/IEC 19788-1:2011, 3.33]

4 Abbreviated terms

The following symbols and abbreviations and acronyms are used in this document.

DCMI   Dublin Core Metadata Initiative

DES   Data Element Specification

LOM   Learning Object Metadata

MIME   Multipurpose Internet Mail Extensions

MLR   Metadata for Learning Resources

PRS   Predefined rule set

RC   Resource class

URI   Universal Resource Identifier

URL   Universal Resource Locator

5 Data element specifications

The purpose of clause 5 and its related metadata elements is to provide data element specification attributes, as introduced in section 6.2 of ISO/IEC 19788-1:2011 *Framework,* for technical aspects of a learning resource.

5.1 Location (DES0100)

Data element specification	
Identifier	ISO_IEC_19788-4:2014::DES0100
Data element specification attributes	
Property name	location
Definition	place, either physical or electronic, that can be used to access the learning resource.
Linguistic indicator	linguistic
Domain	Learning Resource (ISO_IEC_19788-1:2011::RC0002)

Data element specification	
Identifier	ISO_IEC_19788-4:2014::DES0100
Range<?>	literal
Content value rules	MLR STRING (ISO_IEC_19788-1:2011::PRS0001)
Refines	-
Example(s)	EXAMPLE1 http://www.edunet4u.net/engedunet/bs_04.html# EXAMPLE2 "When you enter the library, turn right and it is on the first shelf"
Note(s)	NOTE1 This is where the learning resource described by this metadata instance is physically located. NOTE2 This element is compatible with IEEE 1484.12.1-2002, 4.3 location.

5.2 Size (DES0200)

Data element specification	
Identifier	ISO_IEC_19788-4:2014::DES0200
Data element specification attributes	
Property name	size
Definition	volume in units of measurement appropriate for the learning resource
Linguistic indicator	linguistic
Domain	Learning Resource (ISO_IEC_19788-1:2011::RC0002)
Range	literal
Content value rules	MLR STRING (ISO_IEC_19788-2:2011::PRS0001)
Refines	-
Example(s)	EXAMPLE1 73 MB of a digital textbook EXAMPLE2 2 films (in French) / 2 movies (in English)
Note(s)	NOTE1 extent of a resource might be expressed in bytes NOTE2 the measurement would normally include the units in which it is given, the units chosen being appropriate to the medium in which the resource is expressed.

5.3 Duration (DES0300)

Data element specification	
Identifier	ISO_IEC_19788-4:2014::DES0300
Data element specification attributes	
Property name	duration
Definition	length of time of the learning resource when it is played or run on its appropriate technical platform, at its intended speed.
Linguistic indicator	non-linguistic
Domain	Learning Resource (ISO_IEC_19788-1:2011::RC0002)
Range	literal