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

**Part 1:
Framework**

iTeh STANDARD PREVIEW
*Technologies de l'information — Apprentissage, éducation et
formation — Métadonnées pour ressources d'apprentissage —
Partie 1: Charpente*
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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 19788-1 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* [ISO/IEC 19788-1:2011](https://standards.iteh.ai/catalog/standards/sist/9be47c41-d7c6-4d2d-9af0-1f4879eddf84/iso-iec-19788-1-2011)
- *Part 2: Dublin Core elements* <https://standards.iteh.ai/catalog/standards/sist/9be47c41-d7c6-4d2d-9af0-1f4879eddf84/iso-iec-19788-1-2011>

The following parts are under preparation:

- *Part 3: Basic application profile*
- *Part 5: Educational elements*
- *Part 6: Availability, distribution, and intellectual property elements*

Technical elements will form the subject of a future Part 4.

Introduction

The primary purpose of ISO/IEC 19788 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. ISO/IEC 19788 is based on identified user requirements.

This part of ISO/IEC 19788 includes rules for the assignment and management of identifiers, and the development of subsequent parts fulfilling specific user needs.

Additionally, this part of ISO/IEC 19788 specifies how to define application profiles.

At the same time, ISO/IEC 19788 takes into account the diversity of cultural and linguistic contexts in which learning resources and their metadata are likely to be created and exploited. ISO/IEC 19788 also facilitates the sharing and reuse of learning resource descriptions by providing specific elements to support metadata harvesting.

ISO/IEC 19788 aims to specify data elements relating to learning resources to be expressed in a range of established formats, providing optimal compatibility with IEEE 1484.12.1-2002 and ISO 15836:2009 (see Bibliography), while also addressing user-driven requirements and uses not explicitly addressed in those two standards. These data elements are used to form the description of a learning resource.

In addition to this part of ISO/IEC 19788, ISO/IEC 19788-2 and ISO/IEC 19788-3, ISO/IEC 19788 is modularly structured with all subsequent parts having a distinct scope. Each of these parts represents a specified set of user requirements for the identification and specification of data elements having a particular focus and intended use in the description of a learning resource. This includes categories of data elements focused on technical perspectives, educational (pedagogical) aspects, availability and intellectual property aspects, classification schemes, life cycle management, registration, etc. This also includes the use of application profiles stating the rules for combining metadata elements from various parts of ISO/IEC 19788 and other specifications to support the description of a learning resource, e.g. a MLR record, in a particular context, as well as that of a particular jurisdictional domain, organization, public administration, etc.

The identification and specification of particular metadata elements are not included in this part of ISO/IEC 19788 but in subsequent parts. Also excluded from this part of ISO/IEC 19788 are the specification of bindings for data elements (e.g. XML bindings) and the description of particular application profiles. These will be considered in subsequent parts. Nevertheless, XML snippets can be used in an informal way in examples.

The following aspects might be addressed in a subsequent edition of ISO/IEC 19788-1 or in another part of ISO/IEC 19788:

- additional data element specification attributes;
- registration of MLR records (see 3.23) and assignment of their unique identifiers;
- detailed rules governing coded domains;
- Person as a learning resource.

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

Part 1: Framework

1 Scope

The primary purpose of ISO/IEC 19788 is to specify metadata elements and their attributes for the description of learning resources. This includes the rules governing the identification of data elements and the specification of their attributes.

NOTE All concepts are defined in Clause 3.

ISO/IEC 19788 provides data elements for the description of learning resources and resources directly related to learning resources.

This part of ISO/IEC 19788 provides principles, rules and structures for the specification of the description of a learning resource; it identifies and specifies the attributes of a data element as well as the rules governing their use. The key principles stated in this part of ISO/IEC 19788 are informed by a user requirements-driven context with the aim of supporting multilingual and cultural adaptability requirements from a global perspective.

This part of ISO/IEC 19788 is information-technology-neutral and defines a set of common approaches, i.e. methodologies and constructs, which apply to the development of the subsequent parts of ISO/IEC 19788.

2 Normative references

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

ISO 639-2:1998(E/F), *Codes for the representation of names of languages — Part 2: Alpha-3 code/Codes pour la représentation des noms de langue — Partie 2: Code alpha-3*

ISO 639-3:2007(E), *Codes for the representation of names of languages — Part 3: Alpha-3 code for comprehensive coverage of languages*

ISO 8601:2004(E), *Data elements and interchange formats — Information interchange — Representation of dates and times*

ISO/IEC 10646:2003(E), *Information technology — Universal Multiple-Octet Coded Character Set (UCS)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 application profile
defined structured collection of **data element specifications** (3.14) chosen to satisfy the particular needs of a community or communities

NOTE The data element specifications are from the various parts of ISO/IEC 19788 and from other sources.

3.2 application profile record
specified set of **data elements** (3.11) describing a specific **learning resource** (3.20) and obeying the **rules** (3.32) of a specific **application profile** (3.1)

3.3 application profile specification
description of an **application profile** (3.1) by providing its **attribute values** (3.5) and a description of its underlying **data element group specification** (3.13)

3.4 attribute
characteristic of an object or **entity** (3.17)

[ISO/IEC 11179-1:2004, 3.1.1] iTeh STANDARD PREVIEW
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3.5 attribute value
information recorded as the content of an **attribute** (3.4) in a **data element specification** (3.14), **data element group specification** (3.13) or **application profile specification** (3.3)

3.6 conditional
required under certain specified conditions

[ISO/IEC 11179-3:2003, 3.2.9]

NOTE One of the obligation statuses applied to the attributes of a data element (in a data element specification), indicating the conditions under which an attribute value is required.

3.7 conformant data element
data element (3.11) that obeys the **rules** (3.32) of its **data element specification** (3.14)

3.8 conforming MLR record
MLR record (3.24) in which all the **data elements** (3.11) are **conformant data elements** (3.7)

3.9 conforming MLR record relative to an application profile
conforming MLR record (3.8) for which the additional conditions specified in the **application profile specification** (3.3) are satisfied by all the **data elements** (3.11) in the MLR record

3.10 content value
information recorded as the content of the **data element** (3.11), in compliance with its **data element specification** (3.14)

3.11**data element**

unit of data described in a **data element specification** (3.14)

[ISO 9735-1:2002, 4.28]

3.12**data element group**

identified, named set of related **data elements** (3.11) and/or **data element groups** (3.12) as described in a **data element group specification** (3.13)

NOTE A data element group is a structured set of data elements.

3.13**data element group specification**

description of the **data elements** (3.11) or **data element groups** (3.12) constituting the data element group under consideration

3.14**data element specification**

set of **attributes** (3.4) and **attribute value** (3.5) rules characterizing a set of **data elements** (3.11)

NOTE Adapted from the definition of “simple data element specification” in ISO/IEC 9735-1:2002, 4.106.

3.15**definition**

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

[ISO 1087-1:2000, 3.3.1]

3.16**domain**

(data element) **resource class** (3.31) whose **resources** (3.30) are described by the **data element** (3.11) under consideration

NOTE A central resource class for ISO/IEC 19788 is *Learning Resource* (the set of all learning resources).

3.17**entity**

any concrete or abstract thing that exists, did exist, or might exist, including associations among these things

NOTE An entity exists whether data about it are available or not.

EXAMPLE Person, object, event, idea, process, etc.

[ISO/IEC 2382-17:1999, 17.02.05]

3.18**extension**

(rule set) set of all **strings** (3.35) satisfying all the lexical rules in the **rule set** (3.33) under consideration

3.19**identifier**

sequence of characters capable of uniquely identifying an **entity** (3.17)

NOTE 1 An identifier is linguistically neutral, with no translation provided.

NOTE 2 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.

3.20
learning resource

resource (3.30) used for learning, education and training

3.21

literal

string (3.35) representing a value

3.22

mandatory

always required

[ISO/IEC 11179-3:2003, 3.2.17]

NOTE 1 One of the obligation statuses applied to the attributes of a data element (in a data element specification), indicating the conditions under which an attribute value is required.

3.23

metadata element

data element(s) (3.11) used to describe a **learning resource** (3.20)

3.24

MLR record

specified set of **data elements** (3.11) describing a **learning resource** (3.20) and resources directly related to that learning resource

NOTE If the data elements are stored as XML elements in a file (XML document), for example, the MLR record consists of the whole XML document.

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3.25

name

designation of an object by a linguistic expression

ISO/IEC 19788-1:2011

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

3.26

obligation status

⟨attribute⟩ indication of whether or not a value for the **attribute** (3.4) is to be provided

NOTE The obligation status is **mandatory** (3.22), **conditional** (3.6) or **optional** (3.27).

3.27

optional

permitted but not required

NOTE 1 One of the obligation statuses applied to the attributes of a data element (in a data element specification), indicating the conditions under which an attribute value is required.

NOTE 2 Adapted from ISO/IEC 11179-3:2003, 3.2.28].

3.28

range

⟨data element⟩ **resource class** (3.31) to which the **content values** (3.10) of the **data element** (3.11) belong, or set of **literals** (3.21) comprising the string representations of the permissible values of the data element under consideration

3.29 refine

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

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

NOTE 2 Data element instances of the first data element specification are said to 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”.

3.30 resource

entity that can be identified and referenced by an unambiguous and stable **identifier** (3.19) in a recognized identification system

3.31 resource class

set of **resources** (3.30) that can be identified by listing or description of boundaries and meaning and whose properties and behaviour follow the same **rule** (3.32)

NOTE 1 A resource class has the following attributes:

- Identifier;
- Name;
- Definition;
- SubclassOf [multiple inheritance];
- Note.

EXAMPLES *Learning Resource* (set of all learning resources), *Person* (set of all Persons), *Rights* (set of all rights objects), and *Document* (set of all documents).

NOTE 2 Adapted from the definition of “object class” in ISO/IEC 11179-1:2004, 3.3.22.

3.32 rule

statement that specifies a constraint

NOTE 1 Rules specify conditions that must be complied with. These can include relations among objects and their attributes.

NOTE 2 Rules are of either a mandatory or a conditional nature.

NOTE 3 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 Rules must be explicit and clear enough to be understood by all.

3.33 rule set

defined and pre-established set of **rules** (3.32) that are used together

3.34
strictly conforming MLR record

conforming MLR record (3.8) for which the **data element specification** (3.14) of each **data element** (3.11) comes from a part of ISO/IEC 19788 that specifies data element specifications

3.35
string

sequence of characters considered as a whole

3.36
uniform resource identifier

representation of an **identifier** (3.19) based on the syntax rules provided in RFC 3986.

4 Abbreviated terms

ID	Identifier
IEEE	Institute of Electrical and Electronics Engineers
LOM	Learning Object Metadata
MLR	Metadata Learning Resources
MLR-1	ISO/IEC 19788-1:2010(E), <i>Information technology — Learning, education and training — Metadata for learning resources — Part 1: Framework</i> (this document)
MLR-AP	MLR Application Profile
MLR Record	Metadata for Learning Resource Record
URI	Uniform Resource Identifier
XML	eXtensible Markup Language

5 Principles governing the development of ISO/IEC 19788

The key principles stated in this part of ISO/IEC 19788 are placed in a context driven by user requirements and support multilingual and cultural adaptability requirements from a global perspective.

5.1 A multipart standard

A multipart standard ensures both an integrated approach and a modular approach. Each part has its own scope and purpose and is self-contained. This facilitates use and maintenance of specific parts and thus of the whole standard. In addition, it simplifies further development with new parts to resolve new issues over time.

5.2 Development driven by user requirements

All development of ISO/IEC 19788 is informed by clearly stated and agreed user requirements in the areas of learning, education and training. An important source of user requirements is the public sector, a significant participant in the learning, education and training market.

User requirements are determined by countries participating in the development of the standard and are demonstrated by “use cases” including some related to cultural diversity, the needs of people with disabilities and priorities from a world wide perspective.

5.3 Multilingual equivalencies and multicultural requirements support

ISO/IEC 19788 aims to enable multilingual equivalence and cultural adaptability. This means incorporating and supporting both (1) a top-down requirements approach, i.e., that of jurisdictional domains; and, (2) a bottom-up approach of the requirements of the individual, i.e., human being, as the (final) user, doing so in a global context. To achieve this, ISO/IEC 19788 must support both global interoperability and local specificity, including as examples

- natural and special languages and associated multilingual requirements;
- jurisdictional, legal, regulatory, and geopolitical constraints as mandated by relevant jurisdictional domain(s).

5.4 Support for various levels of granularity

Under some circumstances or user requirements a learning resource may need to be described at a greater level of specificity than what is already provided in some previous part of the standard.

5.5 Re-use of international standards and specifications

Many aspects of ISO/IEC 19788 are not unique to the field of learning, education and training. Therefore, a key strategy in the development and maintenance of ISO/IEC 19788 is utilizing relevant existing international standards and specifications (or applicable parts thereof) to the greatest degree possible.

5.6 User extensions

Standards capture the common user requirements. In the implementation of one (or more) Part(s) of ISO/IEC 19788, however, it is possible that a user may have additional or more precise requirements to be implemented as user extensions or constraints in an Application Profile.

This standard shall enable the introduction of “user extensions” by those implementing one or more parts (or combination of parts). The identification of such user extensions and their specification is supported by the overall architecture and structure of ISO/IEC 19788.

Types of user extensions include:

- the addition of a data element of local value required in addition to those specified in ISO/IEC 19788;
- the ability to include extra content values for a data element.

A “user extension” that attracts widespread and common use may become a candidate for inclusion and incorporation into ISO/IEC 19788, (e.g., in a new part or later edition).

6 Specification of MLR data elements

6.1 Introduction

A primary principle of this part of ISO/IEC 19788 is that a common set of **attributes** specifies the essential characteristics of each **data element**. This clause 6, specification of data elements, defines the attributes of data elements and **rules** for the values of those attributes.

6.2 Data element specification attributes

The identification of data elements must be documented completely. This process is independent of how information system developers and implementers structure their database(s), (e.g., as learning resource repositories, as micro formats...). This is achieved through the use of **data element specifications**.

A **data element specification** consists of an **identifier** (for the data element specification) and a (defined) list of **data element attributes** with rules for the values of those attributes.

Each **data element specification** has the following attributes:

- **Identifier** (data element specification identifier)
- **Property name** (data element name)
- **Definition** (data element definition)
- **Linguistic indicator** (data element linguistic indicator)
- **Domain** (data element domain)
- **Range** (data element range)
- **Content value rules**
- **Refines**
- **Example(s)**
- **Note(s)**

6.2.1 Data element specification attribute Identifier

Identifiers in general, and in particular data element specification identifiers are unique reference tags used to manage each unique data element specification. An identifier usually is a linguistically independent sequence of characters capable of unique and permanent identification. Data elements specification identifiers should:

- be language neutral; <https://standards.iteh.ai/catalog/standards/sist/9be47c41-d7c6-4d2d-9af0-1f4879eddf84/iso-iec-19788-1-2011>
- avoid any ambiguity in the identification of a particular data element specification in ISO/IEC 19788;
- be used to reference and cross-reference data element specifications;
- be information technology platform-independent;
- be as self-explanatory as possible.

6.2.1.1 Rule set for the attribute "Identifier"

[R0001] The obligation status of this attribute is **mandatory**.

[R0002] A value for this attribute is a `DES_Identifier`, where:

```
DES_Identifier ::= Standard_ID "::" DES_ID |  
                "EXTERNAL" "::" DES_ID
```

```
DES_ID ::= "DES" seqN4
```

See Annex B, subclause B.2, for the EBNF production rules.

EXAMPLE Examples of such data element specification identifiers include:
"ISO_IEC_19788-2:2010::DES0020", "ISO_IEC_19788-2:2010::DES0150",
"ISO_IEC_19788-4:2010::DES0290", and "ISO_IEC_19788-6:2010::DES0331".

[R0003] The sequential four (4) digit number part (seqN4) is reset to "0001" within each ISO/IEC 19788 part.

[R0004] A data element specification identifier value is unique (see Annex B)¹.

6.2.2 Data element specification attribute Property name

Data element property names have the following properties:

- each data element property name assigned in ISO/IEC 19788 shall be unique (considering all the Parts of ISO/IEC 19788);
- each data element property name may have multiple equivalent property names in different languages.

6.2.2.1 Rule set for the attribute "Property name"

[R0005] The obligation status of this attribute is **mandatory**.

[R0006] The value of the attribute is a **string**.

[R0007] Each data element property name assigned to data elements in ISO/IEC 19788 shall be unique (considering all the Parts of ISO/IEC 19788), although it may have multiple equivalent names in different languages.

6.2.3 Data element specification attribute Definition

Used to provide a **definition** of the **data element**. Data elements definitions have the following properties:

- data element definitions may have multiple linguistic equivalents.

6.2.3.1 Rule set for the attribute "Definition"

[R0008] The obligation status of this attribute is **mandatory**.

[R0009] The value of the attribute is a **string**.

6.2.4 Data element specification attribute Linguistic indicator

Attribute that serves to specify if the **content value** of the data element is deemed to be linguistically neutral or not.

6.2.4.1 Rule set for the attribute "Linguistic indicator"

[R0010] The obligation status of this attribute is **mandatory**.

¹ For bindings those identifiers will map to URI as defined by IETF RFC 5141 (A Uniform Resource Name (URN) Namespace for the International Organization for Standardization (ISO)). Namespace related to this part of ISO IEC 19788 will be based on IETF RFC 5141 and its proposed process for identifier resolution (clause 2.8). For example, this part of ISO/IEC 19788 (edition 1) document with identifier urn:iso:std:iso-iec:19788:-1:ed-1:en corresponds to the HTTP URI <http://standards.iso.org/iso-iec/19788/-1/ed-1/en/> (using urn:iso:std:iso-iec:19788:-1:ed-1:en would also be possible)