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Entwurf

Informationstechnik – Lernen, Ausbildung und Weiterbildung - Metadaten für Lern-Ressourcen – Teil 1: Das Rahmenwerk (ISO/IEC 19788-1:2011); Englische Fassung FprEN ISO/IEC 19788-1:2012

Information technology –
Learning, education and training - Metadata for learning resources –
Part 1: Framework (ISO/IEC 19788-1:2011);
English version FprEN ISO/IEC 19788-1:2012

Technologies de l'information –
Apprentissage, éducation et formation - Métadonnées pour ressources d'apprentissage –
Partie 1: Charpente (ISO/CEI 19788-1:2011);
Version anglaise FprEN ISO/CEI 19788-1:2012

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Nationales Vorwort

Die Internationale Norm ISO/IEC 19788-1:2011 wurde vom Unterkomitee JTC 1/SC 36 „Information technology for learning, education and training“ des ISO/IEC Gemeinschaftskomitees ISO/IEC JTC 1 „Information technology“ erarbeitet und als FprEN ISO/IEC 19788-1:2012 vom Technischen Komitee CEN/TC 353 „Informations- und Kommunikationstechnologien für Lernen, Ausbildung und Weiterbildung“ übernommen, dessen Sekretariat vom UNI (Italien) gehalten wird.

Das zuständige deutsche Normungsgremium ist der Arbeitsausschuss NA 043-01-36 AA im Normenausschuss Informationstechnik und Anwendungen (NIA) im DIN.

Dieses Dokument enthält unter Berücksichtigung des Präsidialbeschlusses 13/1983 den englischen Originaltext der Internationalen Norm ISO/IEC 19788-1:2011.

Die Internationale Norm ISO/IEC 19788 spezifiziert für die Beschreibung von Lern-Ressourcen Sätze von Metadaten-Elementen zusammen mit ihren Attributen. Dazu gehört auch die Festlegung der Regeln zur Identifikation dieser Datenelemente und Attribute. Diese Metadaten-Elemente bilden dann in Datensätzen zusammengefasst die Beschreibung einer Metadaten-Lern-Ressource, d. h., den „Metadata Learning Resource (MLR) record“.

ISO/IEC 19788-1:2011 stellt die Prinzipien, Regeln und Strukturen für die Beschreibung einer Lern-Ressource zur Verfügung. ISO/IEC 19788-1 identifiziert und spezifiziert sowohl die Attribute eines Datenelements als auch die Regeln für dessen Verwendung.

Die Übernahme der Internationalen Normen ISO/IEC 19788-1:2011 und ISO/IEC 19788-2:2011 in das europäische Normenwerk dient der Propagierung der Verwendung von gemeinsamen Europäischen Normen anstelle von unterschiedlichen nationalen Normen zur Beschreibung von Metadaten für Lern-Ressourcen. Die Übernahme dieser Internationalen Normen in das europäische Normenwerk stellt europaweit eine verbesserte Koordination zwischen Lernangeboten und Lern-Ressourcen sicher.

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Nationaler Anhang NA
(informativ)

Begriffe und Abkürzungen

Die Benummerung entspricht der englischen Originalfassung.

Für die Anwendung dieses Dokuments gelten die folgenden Begriffe.

3 Begriffe

3.1
Anwendungsprofil
definierte strukturierte Sammlung von Datenelement-Beschreibungen (3.14) zur Erfüllung der bestimmten Bedürfnisse einer oder mehrerer Anwendergemeinschaften

ANMERKUNG Die Datenelement-Beschreibungen stammen aus den verschiedenen Teilen von ISO/IEC 19788 und aus anderen Quellen.

3.2
Anwendungsprofil-Eintrag
festgelegter Satz von Datenelementen (3.11), der eine spezifische Lernressource (3.20) beschreibt und die Regeln (3.32) eines spezifischen Anwendungsprofils (3.1) befolgt

3.3
Anwendungsprofil-Beschreibung
Beschreibung eines Anwendungsprofils (3.1) durch Angabe der entsprechenden Attributwerte (3.5) und einer Beschreibung der zugrunde liegenden Datenelementgruppen-Beschreibung (3.13)

3.4
Attribut
Merkmal eines Objekts oder einer Entität (3.17)

[ISO/IEC 11179-1:2004, 3.1.1]

3.5
Attributwert
Informationen, die als Inhalt eines Attributs (3.4) in einer Datenelement-Beschreibung (3.14), einer Datenelementgruppen-Beschreibung (3.13) oder einer Anwendungsprofil-Beschreibung (3.3) erfasst sind

3.6
bedingt
unter bestimmten festgelegten Bedingungen erforderlich

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

ANMERKUNG Ein auf die Attribute eines Datenelements (in einer Datenelement-Beschreibung) angewendeter Pflichtstatus, der die Bedingungen angibt, unter denen ein Attributwert erforderlich ist.

3.7
konformes Datenelement
Datenelement (3.11), das die Regeln (3.32) der entsprechenden Datenelement-Beschreibung (3.14) befolgt

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3.8
konformer MLR-Eintrag
MLR-Eintrag (3.24), in dem alle Datenelemente (3.11) konforme Datenelemente (3.7) sind

3.9
konformer MLR-Eintrag, bezogen auf ein Anwendungsprofil
konformer MLR-Eintrag (3.8), bei dem die in der Anwendungsprofil-Beschreibung (3.3) festgelegten zusätzlichen Bedingungen von allen Datenelementen (3.11) im MLR-Eintrag erfüllt werden

3.10
Wert
Informationen, die als Inhalt des Datenelements (3.11) in Übereinstimmung mit der entsprechenden Datenelement-Beschreibung (3.14) erfasst sind

ISO/IEC 19788-1:2011(E)

3.11
Datenelement
Gebilde aus Daten, das in einer Datenelement-Beschreibung (3.14) beschrieben ist

[ISO 9735-1:2002, 4.28]

3.12
Datenelementgruppe
identifizierter, benannter Satz von zusammengehörigen Datenelementen (3.11) und/oder Datenelementgruppen (3.12), wie in der Datenelementgruppen-Beschreibung (3.13) beschrieben

ANMERKUNG Eine Datenelementgruppe ist ein strukturierter Satz von Datenelementen.

3.13
Datenelementgruppen-Beschreibung
Beschreibung der Datenelemente (3.11) oder Datenelementgruppen (3.12), die die vorliegende Datenelementgruppe bilden

3.14
Datenelement-Beschreibung
Satz von Regeln für Attribute (3.4) und Attributwerte (3.5), der einen Satz von Datenelementen (3.11) charakterisiert

ANMERKUNG Abgeleitet aus der Definition von „Beschreibung der einfachen Datenelemente“ in ISO/IEC 9735-1:2002, 4.106.

3.15
Definition
Darstellung eines Begriffs durch eine beschreibende Aussage, die dazu dient, diesen von verwandten Begriffen zu unterscheiden

[ISO 1087-1:2000, 3.3.1]

3.16
Domäne
[Datenelement] Ressourcenklasse (3.31), deren Ressourcen (3.30) durch das vorliegende Datenelement (3.11) beschrieben werden

ANMERKUNG Eine zentrale Ressourcenklasse für ISO/IEC 19788 ist Learning Resource (die Menge aller Lernressourcen).

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3.17
Entität
beliebiges konkretes oder abstraktes Objekt, das existiert, existiert hat oder existieren könnte, einschließlich der Zusammenhänge zwischen diesen Objekten

ANMERKUNG Eine Entität existiert unabhängig davon, ob Daten zu ihr verfügbar sind.

BEISPIEL Person, Objekt, Ereignis, Idee, Prozess usw.

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

3.18
Erweiterung
[Satz von Regeln] Satz aller Zeichenketten (3.35), die alle lexikalischen Regeln im vorliegenden Satz von Regeln (3.33) erfüllen

3.19
Bezeichner
Folge von Zeichen, mit der eine Entität (3.17) eindeutig identifiziert werden kann

ANMERKUNG 1 Ein Bezeichner ist linguistisch neutral und wird nicht übersetzt.

ANMERKUNG 2 Ein Bezeichner kann ein zusammengesetzter Bezeichner sein, d. h. ein eindeutiger Bezeichner, der aus zwei oder mehr Bezeichnern und/oder anderen Datenelementen besteht, deren Wechselwirkungen auf Regeln basieren und die zusammen als „einzelner“ Bezeichner verwendet werden.

ISO/IEC 19788-1:2011(E)

3.20
Lernressource
Ressource (3.30), die für das Lernen, die Ausbildung und die Weiterbildung verwendet wird

3.21
Literal
Zeichenkette (3.35), die einen Wert darstellt

3.22
obligatorisch
immer erforderlich

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

ANMERKUNG 1 Einer der auf die Attribute eines Datenelements (in einer Datenelement-Beschreibung) angewendete Pflichtstatus, der die Bedingungen angibt, unter denen ein Attributwert erforderlich ist.

3.23
Metadatenelement
Datenelement(e) (3.11), das (die) zur Beschreibung einer Lernressource (3.20) verwendet wird (werden)

3.24
MLR-Eintrag
festgelegter Satz von Datenelementen (3.11), der eine Lernressource (3.20) und direkt zu dieser Lernressource gehörige Ressourcen beschreibt

ANMERKUNG Wenn die Datenelemente z. B. als XML-Elemente in einer Datei (XML-Dokument) gespeichert werden, besteht der MLR-Eintrag aus dem gesamten XML-Dokument.

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3.25
Name
Bezeichnung eines Objekts mithilfe eines linguistischen Ausdrucks

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

3.26
Pflichtstatus
[Attribut] Angabe, ob ein Wert für das Attribut (3.4) anzugeben ist

ANMERKUNG Der Pflichtstatus ist obligatorisch (3.22), bedingt (3.6) oder optional (3.27).

3.27
optional
zulässig, aber nicht erforderlich

ANMERKUNG 1 Auf die Attribute eines Datenelements (in einer Datenelement-Beschreibung) angewendeter Pflichtstatus, der die Bedingungen angibt, unter denen ein Attributwert erforderlich ist.

ANMERKUNG 2 Abgeleitet aus ISO/IEC 11179-3:2003, 3.2.28.

3.28
Bereich
[Datenelement] Ressourcenklasse (3.31), zu der die Werte (3.10) des Datenelements (3.11) gehören, oder Satz von Literalen (3.21), der die Zeichenkettendarstellungen der zulässigen Werte des vorliegenden Datenelements umfasst

ISO/IEC 19788-1:2011(E)

3.29
verfeinern
[Datenelement-Beschreibung] über eine assoziierte Eigenschaft verfügen, die eine Sub-Eigenschaft der Eigenschaft ist, mit der sie assoziiert wird

ANMERKUNG 1 Dies impliziert, dass der Wert des Domänenattributs der ersten Datenelement-Beschreibung mit dem Wert des Domänenattributs der zweiten Datenelement-Beschreibung identisch oder eine korrekte Teilmenge dieses Wertes ist und dass der Wert des Bereichsattributs der ersten Datenelement-Beschreibung mit dem Wert des Bereichsattributs der zweiten Datenelement-Beschreibung identisch oder eine korrekte Teilmenge dieses Wertes ist.

ANMERKUNG 2 Datenelement-Instanzen der ersten Datenelement-Beschreibung sollen Datenelement-Instanzen der zweiten Datenelement-Beschreibung verfeinern.

BEISPIEL 1 Die Eigenschaft „Sohn von“ verfeinert die Eigenschaft „Kind von“.

BEISPIEL 2 Die Eigenschaft „hat Mutter“ verfeinert die Eigenschaft „hat Elternteil“.

3.30
Ressource
Entität, die mithilfe eines eindeutigen und festen Bezeichners (3.19) in einem anerkannten Identifikationssystem identifiziert und referenziert werden kann

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3.31
Ressourcenklasse
Satz von Ressourcen (3.30), der durch Auflistung oder Beschreibung von Begrenzungen und einer Bedeutung identifiziert werden kann und dessen Eigenschaften und Verhalten derselben Regel (3.32) folgen

ANMERKUNG 1 Eine Ressourcenklasse verfügt über die folgenden Attribute:

— Identifier (de: Bezeichner);

— Name (de: Name);

— Definition (de: Definition);

— SubclassOf (de: Subklasse von) [Mehrfachvererbung];

— Note (de: Anmerkung).

BEISPIELE *Learning Resource* (Menge aller Lernressourcen), *Person* (Menge aller Personen), *Rights* (Menge aller Rechte-Objekte) und *Document* (Menge aller Dokumente).

ANMERKUNG 2 Abgeleitet aus der Definition von „Objektklasse“ in ISO/IEC 11179-1:2004, 3.3.22.

3.32
Regel
Aussage, die eine Beschränkung festlegt

ANMERKUNG 1 Regeln legen Bedingungen fest, die eingehalten werden müssen. Dazu können Relationen zwischen Objekten und ihren Attributen gehören.

ANMERKUNG 2 Regeln sind entweder obligatorischer oder bedingter Art.

ANMERKUNG 3 In MLR legen Regeln die Bedingungen, die den Inhalt steuern, d. h. die Exaktheit der Semantik der Daten sicherstellen, formal fest und werden auf diese angewendet.

ANMERKUNG 4 Regeln müssen ausreichend explizit und deutlich sein, sodass sie von jedermann verstanden werden können.

3.33
Satz von Regeln
definierter und vorher festgelegter Satz von Regeln (3.32), die zusammen verwendet werden

ISO/IEC 19788-1:2011(E)

3.34
streng konformer MLR-Eintrag
konformer MLR-Eintrag (3.8), bei dem die Datenelement-Beschreibung (3.14) jedes Datenelements (3.11) aus einem Teil der Norm ISO/IEC 19788 stammt, die Datenelement-Beschreibungen festlegt

3.35
Zeichenkette
eine als Einheit betrachtete Folge von Zeichen

3.36
einheitlicher Bezeichner für Ressourcen
Darstellung eines Bezeichners (3.19), die auf den in RFC 3986 festgelegten Syntaxregeln basiert

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4 Abkürzungen

ID	Bezeichner (en: Identifier)
IEEE	Institute of Electrical and Electronics Engineers
LOM	Metadaten von Lernobjekten (en: Learning Object Metadata)
MLR	Metadaten für Lernressourcen (en: Metadata Learning Resources)
MLR-1	ISO/IEC 19788-1:2010(E), Informationstechnik — Lernen, Ausbilden und Weiterbilden — Metadaten für Lernressourcen — Teil 1: Das Rahmenwerk (vorliegendes Dokument)
MLR-AP	MLR-Anwendungsprofil
MLR	MLR-Eintrag (en: Metadata for Learning Resource Record)
URI	einheitlicher Bezeichner für Ressourcen (en: Uniform Resource Identifier)
XML	erweiterbare Auszeichnungssprache (en: eXtensible Markup Language)

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NORME EUROPÉENNE

EUROPÄISCHE NORM

— *Entwurf* —

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This draft European Standard is submitted to CEN members for unique acceptance procedure. It has been drawn up by the Technical Committee CEN/TC 353.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

The text of ISO/IEC 19788-1:2011 has been prepared by Technical Committee JTC 1 “Information technology” of the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) and has been taken over as FprEN ISO/IEC 19788-1:2012 by Technical Committee CEN/TC 353 “Information and Communication Technologies for Learning, Education and Training” the secretariat of which is held by UNI.

This document is currently submitted to the Unique Acceptance Procedure.

Endorsement notice

The text of ISO/IEC 19788-1:2011 has been approved by CEN as a FprEN ISO/IEC 19788-1:2012 without any modification.

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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.

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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 specification**s (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 element**s (3.11) describing a specific **learning resource** (3.20) and obeying the **rule**s (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 value**s (3.5) and a description of its underlying **data element group specification** (3.13)

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

[ISO/IEC 11179-1:2004, 3.1.1]

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 **rule**s (3.32) of its **data element specification** (3.14)

3.8
conforming MLR record
MLR record (3.24) in which all the **data element**s (3.11) are **conformant data element**s (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 element**s (3.11) and/or **data element group**s (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 element**s (3.11) or **data element group**s (3.12) constituting the data element group under consideration

3.14
data element specification
set of **attribute**s (3.4) and **attribute value** (3.5) rules characterizing a set of **data element**s (3.11)

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

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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 **resource**s (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)

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3.24
MLR record
specified set of **data element**s (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.

3.25
name
designation of an object by a linguistic expression

[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 value**s (3.10) of the **data element** (3.11) belong, or set of **literal**s (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

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3.31
resource class
set of **resource**s (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 **rule**s (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.

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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), *Information technology — Learning, education and training — Metadata for learning resources — Part 1: Framework* (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).

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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 **attribute**s specifies the essential characteristics of each **data element**. This clause 6, specification of data elements, defines the attributes of data elements and **rule**s 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 attribute**s 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)

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- **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;
- 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.

[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)

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