Australian/New Zealand Standard™

Information technology — Learning, education and training — Competency models expressed in MLR

AS/NZS ISO/IEC 22602:2020

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First published as AS/NZS ISO/IEC 22602:2020.

Preface

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee IT-019, Information and Documentation, Information Technology — Learning, Education, Training and Research.

The objective of this Standard is to specify the description of entities of the real world dealing with competencies, competencies description, competencies evaluation, and of the operations done by these entities on competencies.

This document provides a model to express all information required for the exchange and integration of heterogeneous descriptions of "competency" and of heterogeneous "competency objects" as follows:

(a) Any item of discourse in the real world related to "competency" has a representation preserving its meaning in the proposed model.

(b) This representation allows comparison, hierarchical classification and aggregation of different items of discourse related to "competency".

The concrete content of items of discourse in the real world related to "competency" is not specified in this document, which only deals with the formal expression of the discourse.

This Standard is identical with, and has been reproduced from, ISO/IEC 22602:2019, *Information technology — Learning, education and training — Competency models expressed in MLR*.

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Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms "normative" and "informative" are used in Standards to define the application of the appendices or annexes to which they apply. A "normative" appendix or annex is an integral part of a Standard, whereas an "informative" appendix or annex is only for information and guidance.

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

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

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

ISO/IEC 19788-1 provides metadata for learning resources (MLR) and consists of a set of data element concepts and conceptual domains (as defined in the ISO 11179 series) allowing the description of a conceptual level independently of any particular representation. This means that any educational metadata schema can be specified using MLR.

Schemas describing competencies are used in many information models related to learning, education and training, such as school transcripts, learning objectives, curricula descriptions, employer job requirements, professional association competency frameworks and national occupational classifications.

Therefore, with the development of the different parts of the ISO/IEC 19788 series and the increasing demand for information models' interoperability, the description of a "competency" in the MLR format appears as a necessity.

Use of MLR can support different types of approaches such as structured database, linked data and RDF models. This means that MLR can be used to describe objects that are used to support the development, identification, and evaluation of competencies within IT systems that use heterogeneous approaches and have varying forms, among which are included those proposed in ISO/IEC 20006-1[1] and ISO/IEC 20006-2[2].

This document provides a generic representation of a "competency" that will facilitate the exchange of information between systems using different data models to represent competencies, and the linkage of competency models to other metadata models.

This document can be used either alone or together with other standards to express and compare contextual views of schemas that describe competencies.

Relationship to ISO/IEC TR 24763

A "competency" is an item of discourse that refers to some entities of the real world. The meaning of this item of discourse as a "competency" description is given by fixed relationships between some classes of entities of the real world, which create a recognizable "competency pattern" independent of the description itself.

A tentative description of this pattern has been proposed in ISO/IEC TR 24763 as the "conceptual reference model for competencies and related objects". It aims to clarify the information types and relationships that are used within IT systems to support the description, management, development, transfer and assessment of competency information or other related objects.

The conceptual reference model (CRM), as outlined in ISO/IEC TR 24763, is further developed and refined in this document.

The main development of the CRM proposed in this document provides an abstract model of a "competency" and related entities that allows accounting for the meaning of any competency description in the real world. It is composed of:

1) a fixed structural model describing the competency world (i.e. the entities referred to in discourse about competencies and their relationships in context);

2) an open and extensible semantic structured layer attached to each of the competency world entities, allowing for the description of various aspects or dimensions or facets of an instance of the entity.

The two-level model

The fixed structural model describing the competency world is derived from the conceptual reference model for competency information and related objects published in ISO/IEC TR 24763.

The amended structural model of the competency world is presented in Figure 1.

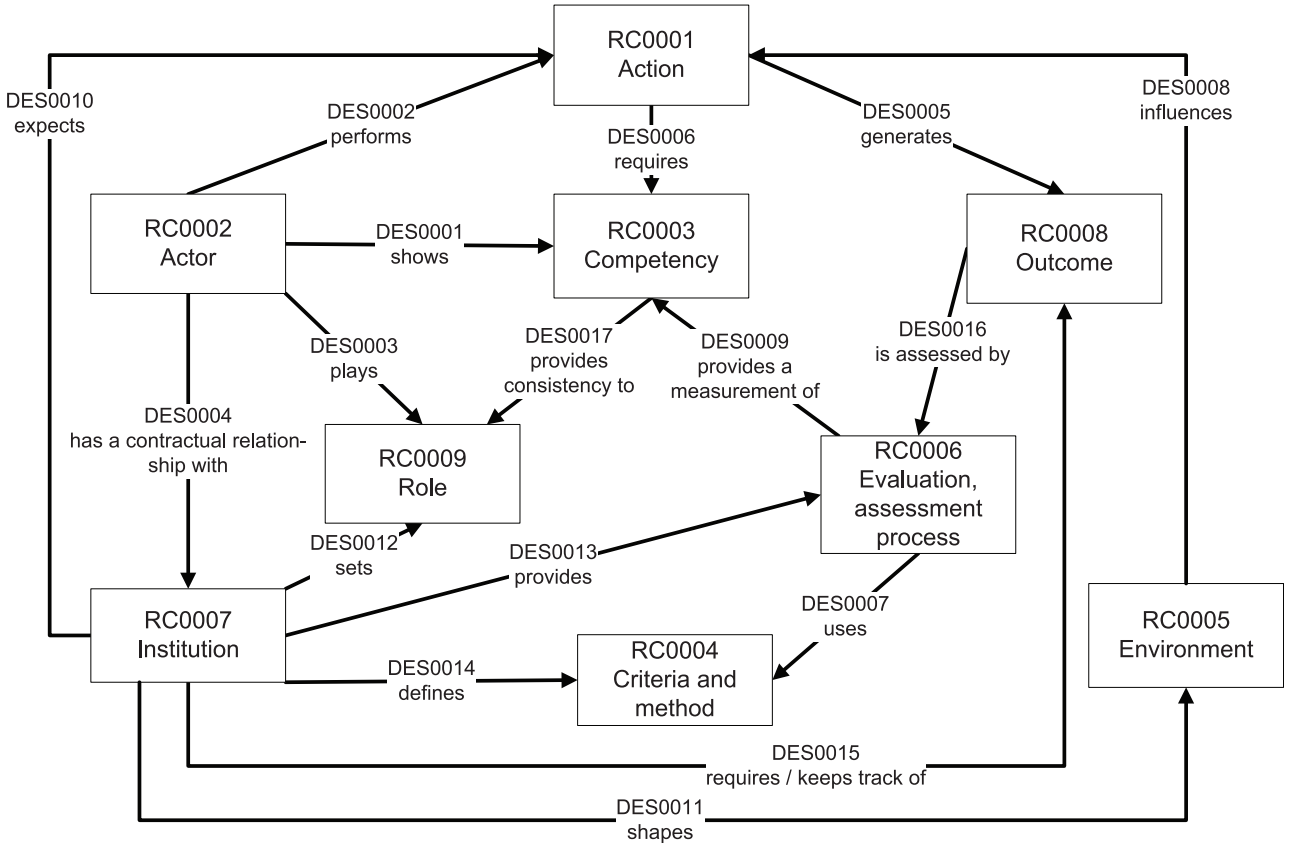

Figure 1 — Structural model describing the competency world (adapted from ISO/IEC TR 24763)

For semantic consistency, the following amendments have been made to the original model, concerning the names of classes and of properties.

— Classes

  — The linguistically neutral identifiers used in ISO/IEC TR 24763 are in the form “En”, where “E” stands for “Entity”, and “n” is a number. In this document, they are replaced by MLR identifiers “RCnnnn”, where RC stands for Resource Class, and n is a number. As an example, E1 [Action] becomes *RC0001 Action*.

  — The class E7 initially named in English “*[LET Institution]*” has been replaced by its super-class “*RC0007 Institution*”, which is more generic, and allows the extension of the structural model to any type of institutions, such as companies, which are de facto part of the “competency world”.

— Properties

  — The linguistically neutral identifiers used in ISO/IEC TR 24763 are in the form “Pn”, where “P” stands for “Property”, and “n” is a number. In this document, they are replaced by the standards MLR identifiers “DESnnnn”, where DES stands for “Data Element Specification”, and n is a number. As an example, P1 *[shows]* becomes *DES0001 shows*.

  — The property P8 between E5 [Environment] and E1 [Action] initially named “*shapes*” has been renamed as “*DES0008 influences*” because it is semantically more appropriate.

  — The property P11 between E7 [Institution] and E5 [Environment], initially named “*influences*” has been renamed as “*DES0011 shapes*” because it is semantically more appropriate.

— The property P17 between E9 [Role] and E3 [Competency] initially named "*profiles*" has been reversed and renamed as "*DES0017 provides consistency to*". It has now *RC0003 Competency* as domain and *RC0009 Role* as codomain. The reason is also that it is semantically more appropriate.

Figure 2 represents the open and extensible semantic structured layer attached to each of the competency world entities. Figure 2 shows the generic data property diagram, linking any competency world entity to an MLR string, and the diagram of an example linking instances of a competency world entity to some of its descriptors.

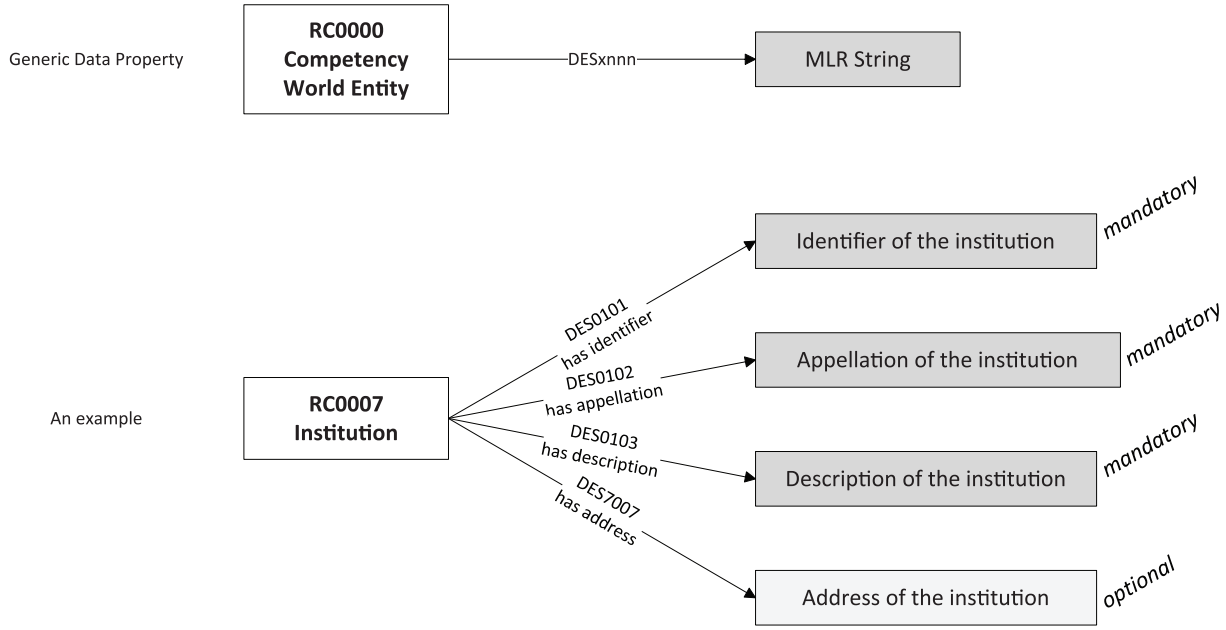

Figure 2 — Open and extensible semantic layer attached to a competency world entity (model and example)

This two-level modelling principle is used to describe a competency in MLR format. The structural model comprises 9 resource classes corresponding to 9 classes of entities in the real world and 17 pairs of properties (Data Element Specifications) corresponding to the relations between the instances of these entities in the real world. Together, they constitute the competency world model. This structural model is described in Clauses 5 and 6.

The semantic layer is attached to each of the 9 classes of entities by data properties, i.e. by properties having as domain an entity of the competency world and a codomain which is "literal". The mandatory data properties are described in Clause 7, together with how to build others.

NOTES

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1 Scope

This document specifies the description of entities of the real world dealing with competencies, competencies description, competencies evaluation, and of the operations done by these entities on competencies.

This document provides a model to express all information required for the exchange and integration of heterogeneous descriptions of "competency" and of heterogeneous "competency objects":

— any item of discourse in the real world related to "competency" has a representation preserving its meaning in the proposed model;

— this representation allows comparison, hierarchical classification and aggregation of different items of discourse related to "competency".

The concrete content of items of discourse in the real world related to "competency" is not specified in this document, which only deals with the formal expression of the discourse.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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/IEC 19788-1, *Information technology — Learning, education and training — Metadata for learning resources — Part 1: Framework*

ISO/IEC/TR 24763, *Information technology — Learning, education and training — Conceptual Reference Model for Competency Information and Related Objects*

3 Terms, definitions, abbreviated terms and symbols

For the purposes of this document, the terms, definitions, abbreviated terms and symbols given in ISO/IEC 19788-1, ISO/IEC TR 24763 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at www.iso.org/members.html

3.1
appellation
designation of an object by a linguistic expression

Note 1 to entry: This term is more generic than Name (ISO/IEC 19788-1) but can be defined in exactly the same way.

3.2
competency
observable or measurable ability of an actor to perform necessary action(s) in given context(s) to achieve specific outcome(s)

Note 1 to entry: Adapted from ISO/IEC TR 24763:2011, 2.2.