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Information technology for learning, education and training — Information model for competency —

Part 2: Proficiency level information model

Technologies de l'information pour l'apprentissage, l'éducation et la formation — Modèle d'information pour les compétences —

Partie 2: Modèle d'information des niveaux de compétence

Reference number
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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.

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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword — Supplementary information.

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, Subcommitee SC 36, *Information technology for learning, education and training*.

ISO/IEC 20006 consists of the following parts, under the general title *Information technology for learning, education and training — Information model for competency*:

— *Part 1: Competency general framework and information model*

— *Part 2: Proficiency level information model*

The following parts are under preparation:

— *Part 3: Guidelines for the aggregation of competency information and data*

Introduction

From the late 1990s, some industrial and academic organizations have developed information technology standards in the skills and competency domain, such as human resources, on a global level to address the interoperability requirements and environment complexities of management and sharing of competency information amongst different organizations. Some examples include work spearheaded by the following organizations: the IMS Global Learning Consortium Inc., HR-XML Consortium, IEEE-LTSC, OMG, CEN TC353, HRMLs, and also ISO/IEC JTC 1/SC36 itself. Some typical problems encountered by stakeholders as well as ITLET systems dedicated to the management and exchange of competency information and where these issues may be encountered are provided in examples below.[1]

Example 1: Technical — Competency and associated information cannot always be selected and shared between different ITLET systems (e.g. learning management, HR, and other related platforms).

Example 2: Organizational — Competency and associated information is not easily used in human development activities, because skills and competency information may be detailed or expressed differently in various ITLET systems (e.g. learning management, HR, national occupational classification, and other related systems).

Example 3: Information exchange — Skills and competency proficiency information, such as individual status or degrees acquired, cannot be shared easily amongst different ITLET systems (e.g. HR, learning management, national occupational classification, and other related systems).

Example 4: Individual learner — Individual developmental learning, education, and training paths cannot easily migrate or be exchanged amongst ITLET systems.

Example 5: Systems perspective (where systems include individuals, organizations, and the technologies that support them) — Individuals and organizations cannot easily design and integrate informal and formal learning, education, and training opportunities to support life goals, career strategies, and career paths using existing common dimensions within ITLET systems.

Example 6: Practical analytics — The ability to access, extract, and analyse competency and associated information can provide evidence as to whether learning, education, and training information needs are being met in order to analyse lifelong learning, thus where competency information must be drawn from different systems and where non-interoperable format and definitions are used.

Example 7: Assessment and evaluation — ITLET systems (e.g. acknowledgement and consideration are needed regarding evaluation biases in human assessment, the use of varying methods and metrics to evaluate human performance, and the need to conduct accurate skill gap analysis), where ITLET systems that use different competency digital schema are involved.

Example 8: Overarching goals and outcomes — Human assessment and support for the development of human potential requires ITLET systems that provide a more flexible, holistic integration, and exchange of competency and associated information beyond individual learning opportunities, everyday operation, and work performance.

Currently, organizations, such as schools, universities, institutes, and companies, use different ITLET systems to support the use of learning content, to enable and enhance various learning activities, and to provide other services. To meet their missions and goals, such organizations can rely on in-house developers, others such as ITLET vendors or suppliers, or a combination of both to provide and operate IT systems to support LET. This means ITLET operations and other organizational systems that deal with skills and competency information, such as interrelated human resources (HR) information systems, need to be interoperable to allow for communication between organizations, their employees, and outsourcing ITLET providers or suppliers.

The purpose of this International Standard is to provide a framework, models, system architecture used for competency and proficiency information, and a way to aggregate competency information. ISO/IEC 20006-1 International Standard will provide a general framework and information model to manage and exchange information about knowledge, skills, ability, attitude, and educational objectives. Especially, this part ISO/IEC 20006 will focus on extending the concepts contained within

ISO/IEC TR 24763 by providing more detailed information regarding competency information and its information aggregation. This International Standard can be used by software developers and implementers, instructional designers and test designers, and others to ensure that learning, education, and training environments satisfy learners' and organizations' competency needs. ISO/IEC 20006-3 will provide definitions of several types of competency information aggregation, which will provide guidance for all stakeholders to better understand and support the development of interoperable systems that will enable competency information exchange.

Information technology for learning, education and training — Information model for competency —

Part 2: Proficiency level information model

1 Scope

1.1 General

This part of ISO/IEC 20006 provides an information model for competency proficiency and its level. Moreover, it presents several use cases that can be used by software developers, implementers, and architects of human resources systems and learning systems. These use cases will support management and exchange of competency information within information technology systems used for learning, education, and training.

NOTE This International Standard is based on work completed in ISO/IEC TR 24763.

This International Standard includes the following parts:

— ISO/IEC 20006-1, *Information technology for learning, education and training — Information model for competency — Part 1: Competency general framework and information model*

— ISO/IEC 20006-2, *Information technology for learning, education and training — Information model for competency — Part 2: Proficiency level information model*

— ISO/IEC 20006-3, *Information technology for learning, education and training — Information model for competency — Part 3: Guidelines for aggregations of competency information and data*

This part of ISO/IEC 20006 provides an information model used to express the semantics of competency proficiency and its level and can be used to support the management and exchange of competency information amongst information technology systems for learning, education, and training. This part of ISO/IEC 20006 provides

— information model for expressing semantics of competency proficiency and its levels, and

— use cases used to support the development of the competency proficiency level information model.

ISO/IEC 200006-1 provides a framework, information model and use cases to support the management and exchange of competency information. ISO/IEC 20006-3 provides guidelines regarding the aggregation of competency information and data.

1.2 Exclusions

The scope of this part of ISO/IEC 20006 does not include an in-depth technical review of issues related to:

— adaptability to culture, language, and human functions;

— although intended to support, this part of ISO/IEC 20006 does not replace the requirement for regional, transnational, and international agreements relating to the equivalencies of representations of competency proficiency and its associated levels;

— security;

— authentication;

— privacy;

— accessibility.

1.3 Areas not addressed

This part of ISO/IEC 20006 currently does not address the following items:

— e-Profiles, which are a set of records that pertain to an individual (e.g. personnel records, student information system records);

— evidence information;

— assessment methods and metrics information.

2 Conformance

The objective of this part of ISO/IEC 20006 is to support the management and exchange of competency information in a way that will promote and improve interoperability and integration. The proficiency level information model is based on the Conceptual Reference Model for Competency Information and Related Objects (CRM) (defined by ISO/IEC TR 24763). The CRM provides a toolkit that can be used to abstract and identify concepts used within IT systems to support the management and exchange of competency information across different HR, learning, education, and training contexts. This part of ISO/IEC 20006 builds upon the conceptual and abstract focus of ISO/IEC TR 24763 to provide an information model for proficiency or its associated levels and use cases.

To support competency management and development, competency information needs to be structured and described consistently to promote understanding, mutual communication, and agreement. Competency related information should be detailed in a way that is semantically robust and extensible. For the purposes of this part of ISO/IEC 20006, proficiency and level information are conformant if it uses the corresponding information model and the appropriate item notation as provided in Clause 7.

A conforming notation may contain information items that are based on ISO/IEC TR 24763. In other words, it is intended to be extensible and can contain additional information elements of ISO/IEC TR 24763. For information about conformance to ISO/IEC TR 24763, classes associated with a proficiency level in CRM competency are indicated with the following notation [En] where n = a number that refers to a class defined in ISO/IEC TR 24763 to assist with understanding the linkages and relationships between the CRM and this part of ISO/IEC 20001. For example, as noted in ISO/IEC 24763:2011, E1 = Action, E2 = Actor, E3 = Competency, and so on.

3 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 19796-3, *Information technology — Learning, education and training. Quality management, assurance and metrics. Part 3: Method and metrics*

ISO/IEC 20006-1, *Information technology — Learning, education and training. Information model for competency. Part 1: General framework and information model*

ISO/IEC TR 24763, *Information technology — Learning, education and training. Conceptual reference model for competency information and related objects*