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Part 1: Text-based Communication**

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Foreword

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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 19780-1 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 36, *Learning, education and training*.

ISO/IEC 19780 consists of the following parts, under the general title *Information technology — Learning, education and training — Collaborative technology — Collaborative learning communication*:

— *Part 1: Text-based Communication*

Introduction

Collaborative communication in General

Collaborative learning that is supported with information and communication technologies (ICTs) can involve the use of a range of media, including audio (e.g., IP telephony), video (e.g., video over IP), graphics (e.g., shared whiteboard) and text (e.g., chat, computer conferencing). Combinations of these media (e.g. audio telegraphics) can also be used in collaborative learning activities. This multi-part Standard, *ISO/IEC JTC1 19780 ITLET - Collaborative technology – Collaborative learning communication*, focuses on messages and events arising in the course of collaborative learning activities, using a range of *collaborative tools* and media types. This multi-part Standard understands and defines these *expressions* and events as being sent and received by *participants* and within environments, as these are conceptualized and defined in a second collaborative learning Standard, ISO/IEC JTC1 19778 ITLET - Collaborative technology - Collaborative workplace.

The current Standard, the first of the multi-part ISO/IEC JTC1 19780 ITLET Standard, focuses on text-based communications and messages.

In this context, "text" can be defined in terms provided by the Oxford English Dictionary: "the wording of anything expressed; the structure formed by the words in their order; the very words, phrases, and sentences as written." *Text* is further understood here as that which can be expressed using a specified character set (here: the "coded character sets" defined in ISO10646:2003, Information technology—Universal Multiple-Octet Coded Character Set (UCS)). The use of markup languages derived from the specified character set used is also admissible.

Some of the most common forms of ICT-supported collaborative learning involve the exchange of messages or *expressions* using *text*. As defined here, *text*-based collaboration and communication is characterized by relatively short message or *expression* lengths (e.g., a single word to a few paragraphs), and by relatively short time intervals between *expressions* (seconds to days). The result is that content generated through this type of communication tends to be highly context-dependent, with any one *expression* often gaining its meaning from complex relationships to others. This makes the portability and potential reconstruction of these relationships and of this context of great significance.

Within the general parameters described above, the length of, and time intervals between, *text*-based *expressions* or messages can vary. Collaborative technologies and activities with the shortest *expression* and interval lengths are often labeled "synchronous", and tend to be associated with the term "chat." Those with longer interval and *expression* lengths are often labeled "asynchronous", and tend to be associated with terms such as "discussion" or "conferencing." In the terminology defined in ISO/IEC JTC1 19778, both synchronous (chat) and asynchronous (discussion) represent particular *collaborative services*, composed of *collaborative tools* (e.g., ICQ, Windows Messenger, etc.) which provide *collaborative functions* (e.g., instant messaging). These functions, in turn, contribute to particular *collaborative effects* (e.g., facilitating the gradual achievement of consensus).

NOTE Italicized terms in the paragraph above and in the sections below are defined in section 3 of this Standard (under "definitions"), or in ISO/IEC JTC1 19778 ITLET - Collaborative Technology - Collaborative Workplace.

Text-based communication in particular

The current document presents a *Data Model* for *text*-based *expressions*.

A *collaborative workplace* is defined as an instantiated independent entity, consisting of the *collaborative activities* of a *collaborative group* which works together by means of a *collaborative environment* (ISO/IEC JTC1 19778, Parts 1-3).

As the definitions above indicate, *collaborative workplaces* are associated with two major kinds of components:

- 1) *collaborative service* components, and
- 2) *collaborative group* components.

This Standard provides a *Data Model* to accommodate the data constituted by and associated with *text*-based messages or *expressions*, which are exchanged among *collaborative group* members within a *collaborative environment*.

Expressions are composed by and exchanged among *collaborative group* members within a *collaborative workplace*. *Collaborative environment* components (*collaborative services, tools and functions*) facilitate these *collaborative activities*, resulting in various *collaborative effects*. Typical effects may include, e.g., "reaching a compromise on a controversial issue", "exploring arguments for and against a particular decision item", or "getting to know students in a class". The classification and definition of particular *collaborative effects* is outside of the scope of this document. *Expression Data Model instantiations* are associated by reference to *collaborative group Data Model* and *collaborative environment Data Model instantiations*.

This can be illustrated through the example of a mailing list considered as a *collaborative workplace*. Such a *collaborative workplace* is instantiated as an independent entity by associating a particular list of email addresses (each address being associated with a *participant*) with a particular email service (or with specific aspects of such a service). *Collaborative group* members (being identified in the system by their email addresses) interact with each other and with the email service by composing, sending, receiving, reading and responding to email messages or *expressions*. The email service accepts emails from *collaborative group* members only, and forwards or reflects them to all other *collaborative group* members as specified in the email address list of the *collaborative group*.

Naturally, such a collaborative context, as an abstract entity, does not encompass the holders of the email addresses nor the email server, the email clients or the computers of the *participants*.

Expressions are composed, sent and received by members of the *collaborative group*. These *collaborative activities* are made possible through the email service provided through the *collaborative environment*.

Information technology — Learning, education and training — Collaborative technology — Collaborative learning communication — Part 1: Text-based Communication

1 Scope

1.1 Statement of scope

This Part 1 - **Text-based communication** - of the multipart Standard ISO/IEC 19780 specifies the *Data Model* for *text-based expressions*.

The purpose of this Standard is to provide a standardized way of isolating and describing textual *expressions* composed and communicated by *collaborative group* members.

1.2 Excluded subjects and aspects in this Standard

For the purposes of simplicity, the following media and contexts have been excluded from this Standard:

- Communication involving media other than *text*
- Contexts and associated requirements in which one or more *participants* are intended to receive a given *expression* are identified individually, apart from the *collaborative group* (e.g. "whispering" or "private messaging" in chat contexts).

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/IEC 19778:2007 - Collaborative Technology - Collaborative Workplace

ISO/IEC TR 11404:1996 Information technology—Programming languages, their environments and system software interfaces—Language-independent datatypes.

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

ISO/IEC 24703:2004 Information technology -- Participant Identifiers.

ISO 8601:2000 Data elements and interchange formats – Information interchange – Representation of dates and times.

3 Terms and definitions

For the purposes of this document, the terms and definitions provided in ISO/IEC 19778-1:2007 and the following apply.

NOTE The terms defined here are closely interrelated. When a term is utilized elsewhere in this document as defined in this list, or in ISO/IEC JTC1 19778 ITLET - Collaborative Technology - Collaborative Workplace, that term is *italicized*.

3.9

expression

that which is generated or composed, and communicated or exchanged among *participants* in a *collaborative environment*, including metadata and a reference to collaborative communicative contents that is typically both composed and generated (*expression Data Model instance*) (ISO/IEC 19778-2:2007 Part 2)

3.10

expression attachment

file associated with a given *expression*

3.11

expression body

composed contents of the *expression* communicated among *participants* in a *collaborative environment*, related through reference to the *expression Data Model instance*

3.14

text

wording of anything that can be expressed in written form, using a specified character set

NOTE The use of markup languages derived from this specified character set is admissible

4 Abbreviations and acronyms

NOTE Some of the abbreviations or acronyms in this section represent terms defined in Clause 3.

CE -- Collaborative Environment

CG -- Collaborative Group

CT -- Collaborative Technology

CW -- Collaborative Workplace

EX -- Expression

ID – Identifier

ITLET – Information Technology for Learning, Education and Training

Ref -- Reference

URI -- Uniform Resource Identifier

URL -- Uniform Resource Locator (world wide web address)

5 Text-based communication data model

5.1 Overview

The *expression* entity and *Data Model* is related through reference (using ID-Refs) to the other entities constituting the *collaborative workplace* as indicated in Figure 1. Each *expression* is related in this way both to the tool with which it is sent, read and received (the *collaborative tool* and its *collaborative function*), and also to the group member who generated it (as both *participant* and *role holder*).

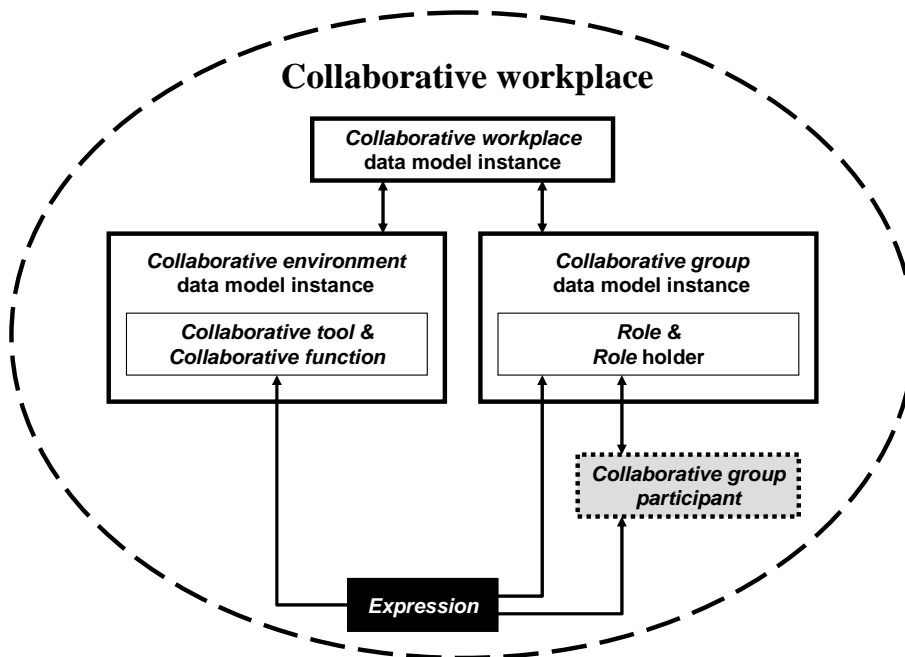


Figure 1: Collaborative environment, collaborative group, and expression entities located and interrelated within a collaborative workplace

The general approach for formulating identifiers in this Standard is the same as that put forward in ISO ISO/IEC 19778:2007. In order to support more than a single identifier format, both standards utilizes a "source" - "value" approach for identifier Data Elements, in which the value of sub-element "source" specifies a URI (Uniform Resource Identifier, e.g. the URL where the specification for the identifier format is found), and the sub-element "value" carries the identifier value itself, which is compliant to the earlier format description. It is the responsibility of the users of this Standard to assure that their identifiers are unique at least within a particular domain or application context.

5.2 Expression data model specification

The table-based *Expression Data Model* representation used here corresponds to the specification provided in ISO/IEC 19778-1:2007, Subclause 5.1.

Table 1 — *Expression data model*

Identifier	Designation	Definition	Obligation	Multiplicity	Datatype	Examples
1	EX_ID	The identifier of this <i>expression Data Model instantiation</i> . Identifies this <i>expression</i> uniquely in the context of the larger <i>collaborative workplace</i> .	<i>mandatory</i>	1	ISO/IEC TR 11404:1996, 10.1.5 "Character string (ISO/IEC 10646:2003)" Supported Length = 250 characters	0241
2	EX_Title	Name or subject given to this <i>expression</i> . The title of this <i>expression</i> can be inherited from a previous <i>expression</i> to which it is related.	<i>optional</i>	1	ISO/IEC TR 11404:1996, 10.1.5 "Character string (ISO/IEC 10646:2003)" Supported Length = 100 characters	Re: Welcome to the course
3	EX_B-Ref	Reference to the <i>body</i> of this <i>expression</i> .	<i>mandatory</i>	1		
3.1	EX_B-Ref_source	The name or URI of the identification scheme used to generate the value for the <i>expression body</i> reference. A namespace scheme.	<i>optional</i>	1	ISO/IEC TR 11404:1996, 10.1.5 "Character string (ISO/IEC 10646:2003)" Supported Length = 250 characters	http://refreg.org/id=192837
3.2	EX_B-Ref_value	Value of the <i>expression body</i> reference. In exceptional cases, the <i>expression body</i> may not contain any <i>text</i> ; however, a reference to this "null" or "empty" body is still required. The manner in which this empty body is constituted is considered out of scope for this Standard.	<i>mandatory</i>	1	ISO/IEC TR 11404:1996, 10.1.5 "Character string (ISO/IEC 10646:2003)" Supported Length = 250 characters Permissible values shall comply with any specification or standard identified by the reference value in 3.1, EX_B-Ref_source (if provided).	8693073_ss22

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Identifier	Designation	Definition	Obligation	Multiplicity	Datatype	Examples
4	EX_A-Ref	Reference(s) to file(s) which are made accessible with this <i>expression</i> .	<i>optional</i>	1..20		
4.1	EX_A-Ref_source	The name or URI of the identification scheme used to generate the value for the <i>expression attachment</i> reference. A namespace scheme.	<i>optional</i>	1	ISO/IEC TR 11404:1996, 10.1.5 "Character string (ISO/IEC 10646:2003)" Supported Length = 250 characters	http://refreg.org/id=192837
4.2	EX_A-Ref_value	Value of the <i>expression attachment</i> reference.	<i>mandatory</i>	1	ISO/IEC TR 11404:1996, 10.1.5 "Character string (ISO/IEC 10646:2003)" Supported Length = 250 characters Permissible values shall comply with any specification or standard identified by the reference value in 4.1, EX_A-Ref_source (if provided).	xyz_768594
5	EX_Time_Date	The point in time when this <i>expression</i> was sent	<i>mandatory</i>	1	ISO 8601:2004(E), 4.3 "Date and time of day"	2005-03-11T23:05:33.043+02:00
6	CG_Role_name	Name of the <i>role</i> played by the member of the <i>collaborative group</i> while generating and exchanging this <i>expression</i> . Corresponds to the <i>Data Element</i> ISO/IEC 19778-3:2007, 2.2.1 that is provided for this <i>role</i>	<i>mandatory</i>	1	ISO/IEC TR 11404:1996, 10.1.5 "Character string (ISO/IEC 10646:2003)" Supported Length = 100 characters	Moderator

Identifier	Designation	Definition	Obligation	Multiplicity	Datatype	Examples
7	CG_Role_holder_ID-Ref	Identifier reference to that <i>role holder Data Model Element instantiation</i> which is associated with the generation and exchange of this <i>expression</i> . ^a Corresponds to the <i>Data Element</i> ISO/IEC 19778-3:2007, 2.2.2.1 that is provided for this <i>role holder</i>	<i>mandatory</i>	1	ISO/IEC TR 11404:1996, 10.1.5 "Character string (ISO/IEC 10646:2003)" Supported Length = 250 characters	norm_friesen@sfu.ca
8	CW_ID-Ref	A reference to or identifier for the <i>collaborative workplace</i> that serves as the context for this <i>expression</i> . Corresponds to the <i>Data Element</i> ISO/IEC 19778-1:2007, 1.3.2 for the <i>collaborative workplace</i> where this <i>expression</i> has been generated	<i>mandatory</i>	1	ISO/IEC TR 11404:1996, 10.1.5 "Character string (ISO/IEC 10646:2003)" Supported Length = 250 characters	http://www.sfu.ca/WP2006-10-28_16-30-44.12
9	EX_Function	Indicates the <i>collaborative tool</i> and that tool's <i>collaborative function</i> as they are utilized in the generation and communication of this <i>expression</i> .	<i>optional</i>	1		
9.1	CE_Tool_name	Name of the <i>collaborative tool</i> used for generating and communicating this <i>expression</i> . In the context of the <i>collaborative tool</i> which generated this <i>expression</i> : corresponding to the appropriate <i>instantiation</i> of the <i>Data Element</i> ISO/IEC 19778-2:2007, 2.2.1	<i>mandatory</i>	1	ISO/IEC TR 11404:1996, 10.1.5 "Character string (ISO/IEC 10646:2003)" Supported Length = 100 characters	Windows Messenger

Identifier	Designation	Definition	Obligation	Multiplicity	Datatype	Examples
9.2	CE_Function_name	Name of the <i>collaborative function</i> used for generating and communicating this <i>expression</i> . In the context of the pair " <i>collaborative tool/collaborative function</i> " which generated this <i>expression</i> : corresponding to the appropriate <i>instantiation</i> of the data element ISO/IEC 19778-2:2007, 2.3.3.2.1	<i>optional</i>	1	ISO/IEC TR 11404:1996, 10.1.5 "Character string (ISO/IEC 10646:2003)" Supported Length = 100 characters	Instant messaging
10	EX_Reply-to_ID-Ref	The identifier of an <i>expression</i> (i.e. the value of element EX1 of a different <i>expression Data Model instantiation</i>) to which this <i>expression</i> is a reply. The <i>expression</i> replied to must be generated and communicated inside this <i>collaborative workplace</i> . When this <i>expression</i> is the first in a thread, the value of this element will be a "null value", a particular value as used, for example, at http://www.ukoln.ac.uk/metadata/tf-chic/soif/ .	<i>mandatory</i>	1	ISO/IEC TR 11404:1996, 10.1.5 "Character string (ISO/IEC 10646:2003)" Supported Length = 250 characters	vo78
11	EX_Relation	Specification of a relation to another <i>expression</i> (other than Reply-to) generated and communicated inside this <i>collaborative workplace</i> .	<i>optional</i>	1..10		
11.1	EX_Relation_ID-Ref	The identifier (i.e. the value of the associated <i>Data Element EX_ID</i>) of that <i>expression</i> (generated and communicated inside this <i>collaborative workplace</i>) to which this <i>expression</i> relates.	<i>mandatory</i>	1	ISO/IEC TR 11404:1996, 10.1.5 "Character string (ISO/IEC 10646:2003)" Supported Length = 250 characters	vo99

Identifier	Designation	Definition	Obligation	Multiplicity	Datatype	Examples
11.2	EX_Relation_type-source	Source of the vocabulary used to indicate the type of relation.	<i>mandatory</i>	1	ISO/IEC TR 11404:1996, 10.1.5 "Character string (ISO/IEC 10646:2003)" Supported Length = 250 characters	http://vocabreg.org/id=1649237
11.3	EX_Relation_type	Specification of the type of relationship.	<i>mandatory</i>	1	ISO/IEC 11404:1996, 10.1.5 "Character string (ISO/IEC 10646:2003)" Supported Length = 100 characters Permissible values shall comply with any specification or standard identified by the reference value in <i>Data Element</i> 11.2 (if provided).	Counterargument
<p>^a This reference allows also the location and provision of the parent and sibling <i>Data Model Element</i> s of the referenced <i>role holder Data Model Element</i> instantiation.</p>						

5.3 Supplemental information for the expression data model

5.3.1 Data element EX_ID

The *expression* identifier serves as a label for an *expression*, allowing (among other things) for the inter-linking of related *expressions* within a particular *collaborative workplace*.

NOTE As every *expression* is an entity internal to a particular *collaborative workplace*, *expression* identifiers do not use a "source-value" approach (like the *collaborative workplace* identifiers do). However, *expression* identifiers should be unambiguous within the context of the *collaborative workplace* within which they are generated and communicated. Precisely how this is done is outside the scope of this Standard.

5.3.2 Data element EX_Title

Name given to the *expression*.

NOTE This name is typically intended for human use. In many cases, the title of an *expression* may be inherited from a previous *expression* to which it is related.

5.3.3 Aggregating element EX_B-Ref

Enables reference to the *expression body*.

In order to support more than a single identifier reference format, a "source-value" approach has been applied in this *Data Element* structure. Accordingly, the value of the sub-element "source" specifies a URI (Uniform Resource Identifier, e.g. a URL) in which the specification of the identifier reference format is provided. This same sub-element can also be used to identify a base address for a folder system that provides associated information.

5.3.4 Data element EX_B-Ref_source

This *Data Element* specifies a URI providing information indicating the type of identifier used to reference the *expression body*. The URI provided serves multiple purposes:

- The URI identifies a particular source from which reference values, unambiguous within the application context, can be derived;
- The URI can also provide access to information regarding the format of the admissible body identifier reference values for *expression* bodies. These regulations generally specify how such identifier references are constructed (within the limits of their datatype). Typically, such a specification may restrict the permitted character set, may specify particular characters with special meaning (e.g. separators between distinct fields of the character string), and may restrict the length or the number of characters supported for the character string.

NOTE The precise format of such "source" specifications is outside of the scope of this Standard. In particular, this Standard is neutral on the question as to whether such specifications are intended for automated use or (also) for human reading and interpretation.

NOTE This *Data Element* is *optional* (not *mandatory*) in order to allow simple applications of this *Data Model*, in which the uniqueness of identifier references within the *collaborative workplace* is ensured through other means

5.3.5 Data element EX_B-Ref_value

This *Data Element* represents the reference to the body of the *expression*. This identifier shall be unique at least within the technical context in which this *Data Model instantiation* is utilized.

5.3.6 Aggregating element EX_A-Ref

Enables reference to the *expression attachment* associated with the given *expression*.

In order to support more than a single identifier reference format, a "source-value" approach has been applied in this *Data Element* structure. Accordingly, the value of the sub-element "source" specifies a URI (Uniform Resource Identifier, e.g. a URL) in which the format of the identifier reference is specified. This same sub-

element can also identify a base address for a folder system that provides associated *expression attachments*. The sub-element "value" is the URI or identifier reference itself, corresponding to the format specified through "source."

5.3.7 Data element EX_A-Ref_source

This *Data Element* specifies a URI providing information indicating the type of identifier used to reference the *expression body*. The URI provided serves multiple purposes:

- The URI identifies a particular source from which reference values, unambiguous within the application context, can be derived;
- The URI can also provide access to the information regarding the format of the admissible identifier reference values. These regulations generally specify how such identifier references are constructed (within the limits of their datatype). Typically, such specifications may restrict the permitted character set, may specify particular characters with special meaning (e.g. separators between distinct fields of the character string), and may (for *Data Model instantiations* only) restrict the length or the number of characters supported for the character string.

NOTE The precise format of such "source" specifications is outside of the scope of this Standard. In particular, this Standard is neutral on the issue as to whether such specifications are intended for automated use or (also) for human reading and interpretation.

NOTE This *Data Element* is *optional* (not *mandatory*) in order to allow simple applications of this *Data Model*, in which the uniqueness of identifier references within the *collaborative workplace* is ensured through other means.

5.3.8 Data element EX_A-Ref_value

This *Data Element* represents the reference to the *expression attachment*

5.3.9 Data element EX_Time_Date

The point in time when the *expression* was sent.

5.3.10 Data element CG_Role_name

Name given to the *role* played by the *role holder* while generating and exchanging the *expression*.

NOTE This name acts as the identifier for the *collaborative role* within the *collaborative workplace* (see ISO/IEC 19788 Parts 1-3).

5.3.11 Data element CG_Role_holder_IDRef

An identifier of the *participant* who is associated with the *role holder* who generated and exchanged the *expression*.

NOTE Any *participant* may have more than a single *participant* identifier. If a *participant* has several identifiers, it is advisable to utilize only one within a particular *collaborative workplace*.

5.3.12 Data element CW_ID-Ref

This *Data Element* references the associated *collaborative workplace Data Model instantiation*.

NOTE As every *expression* is internal to (is associated with) a particular *collaborative workplace*, this identifier reference corresponds to the identifier value of the associated *collaborative workplace*. A separate "source" of this identifier value need not be specified; it is assumed that the *expression* will be identified through the same identification scheme as is used to assign the *collaborative workplace* identifier.

5.3.13 Aggregating element EX_Function

This *Aggregating Element* identifies the *collaborative tool* and *collaborative function* used in generating and exchanging the *expression*.

5.3.14 Data element CE_Tool_name

Name given to the *collaborative tool* corresponding to the *collaborative function* used to generate and exchange the *expression*.

NOTE This name acts as an identifier for the *collaborative tool*. Both the *collaborative tool* and *collaborative function* are identified or specified within the *collaborative workplace* using only their names (see ISO/IEC 19788 Parts 1-3).

5.3.15 Data element CE_Function_name

Name given to the *collaborative function* used to generate and exchange the *expression*.

NOTE This name acts as an identifier for the *collaborative function* of a particular *collaborative tool*. Both of these entities (*collaborative function* and *tool*) are identified or specified within the *collaborative workplace* using only their names (see ISO/IEC 19788 Parts 1-3).

5.3.16 Data element EX_Reply-to_ID-Ref

This identifier reference is used to identify another *expression* to which the current *expression* relates as a reply, response or answer.

This single-purpose *expression* identifier serves the purpose of identifying other *expressions* that are generally related to the current *expression*. This relation may be more clearly structural or temporal than explicitly semantic in nature.

5.3.17 Data element EX_Relation

This *Aggregating Element* enables the specification of various kinds of relationships (other than reply) between *expressions*.

5.3.18 Data element EX_Relation_ID-Ref

This multiple-purpose *expression* identifier reference enables the specification of relationships and relationship types (other than reply) between *expressions*.

5.3.19 Data element EX_Relation_type-source

This *Data Element* specifies the URI of a vocabulary used to express one or more types of relations between *expressions*.

5.3.20 Data element EX_Relation_type

This *Data Element* provides the value used to designate the type of relationship between the current *expression* and a second, previous *expression*.

6 Conformance

These conformance specifications regard solely the conformance of *Data Model instantiations* (in contrast to, e.g., conformance specifications regarding applications which may use such *Data Model instantiations*; see ISO/IEC 19778-1:2007 for definitions of *Data Model* and related terms).

For any *Data Model instantiation* that conforms to this Standard the following requirements shall be met:

- The *Data Model instantiation* shall at least provide one or more *Data Model Element instantiations* of any *Data Element* in the *Data Model* where any of its ancestor *Data Model Elements* has either the *Data Model Element obligation status* value "mandatory" or "conditionally mandatory" with the respective condition met. Where more than one *Data Model Element instantiation* is provided for a *Data Element*, this multiple occurrence shall correspond to the specified *Data Model Element multiplicity* attribute for this *Data Element*;

NOTE 1 This rule specifies which *Data Elements* must appear in a *Data Model instantiation*.

- The *Data Model instantiation* shall not contain any *instantiation* of a *Data Element* where the *Data Model Element obligation status* value is "conditionally optional" with the respective condition not met.

NOTE 2 This rule specifies which *Data Elements* of the *Data Model* are not allowed in a *Data Model instantiation*.

- The *Data Model instantiation* shall not contain any instantiated *Data Element* which does not correspond to any of the *Data Elements* and their attribute values of the *Data Model* specified in this Standard.

NOTE 3 This rule forbids any *instantiations* of *Data Elements* that do not conform to the *Data Model* (being not specified at all, or exceeding multiplicity ranges). At the same time, this rule allows the *instantiation* of all the "effectively" (subject to instantiated or implied ancestor *Aggregating Elements*, and the *Data Model Element obligation status* value of the respective *Data Element*) optional *Data Elements*.

- For any *instantiation* of a *Data Element* in a *Data Model instantiation*, both the *Data Model Element identifier* and the value for this *Data Element* shall be provided, where the value of the *instantiation* of the *Data Element* shall correspond to the specified *Data Model Element datatype* attribute for this *Data Element*;

NOTE 4 This rule specifies that the *Data Model Element identifier* and a correct *Data Element* value are required for any instantiated *Data Element*.

- For any *instantiation* of an *Aggregating Element* in a *Data Model instantiation*, the *Data Model Element identifier* shall be provided;

NOTE 5 This rule specifies that the *Data Model Element identifier* is required for every instantiated *Aggregating Element*. No values exist for instantiated *Aggregating Elements*.

- The *Data Model instantiation* shall allow the complete and unambiguous reconstruction of a tree structure for this *Data Model instantiation* that corresponds to the *Data Model* specified in this Standard.

NOTE 6 This rule specifies the requirement of being able to assign the correct tree structure location to any instantiated *Data Model Element*. This rule implies also the instantiation of *Aggregating Elements* with multiple occurrence. *Aggregating Elements* with single occurrence can be reconstructed based on the instantiations of their descendant *Data Model Elements*.

Annex A (informative) Use cases

A.1 Purpose of providing use cases

These use cases are provided to illustrate how the *Data Model* described in this Standard might work in real-world situations.

These two use cases illustrate some requirements for data portability that this Standard addresses. These use cases involve the portability of data associated with *expressions* (in addition to data associated with *collaborative environments, workplaces and tools*).

A.2 Use case: Instructor evaluates collaborative data

Actors:

Instructor: Evaluates all *collaborative activity* occurring in *collaborative environment*. This evaluation takes place multiple times during a course or semester.

Preconditions:

Instructor is able to access *collaborative workplace* and tool data **Basic Flow:**

- 1) Instructor accesses *collaborative workplace*
- 2) Instructor extracts data in vendor-independent format

Post-conditions:

Instructor is able to import and analyze data using latent semantic analysis or network analysis tools.

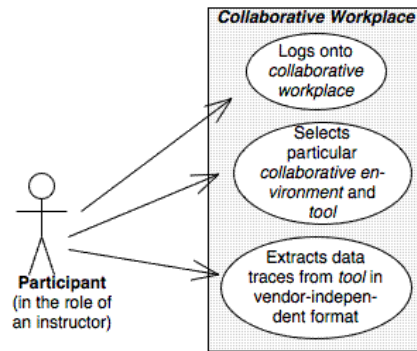


Figure 2: Use case 1 (with instructor)

A.3 Use case: Student ports data to multiple systems

Actors:

Student: is required to monitor and participate in activity occurring in multiple *collaborative services*

Preconditions:

Student is able to access *collaborative workplace*

Student is able to access (and create) *expressions* and associated data

Student has access to tools for aggregating/analyzing *collaborative activity*

Basic Flow:

- 1) Student accesses *collaborative workplace*
- 2) Student accesses data from workplace tool(s)
- 3) Student is able to extract data in vendor-independent format

Post-conditions:

Student is able to import and analyze *collaborative activities* using various tools to learn more about the location and nature of activity, and thereby improve his/her own participation.

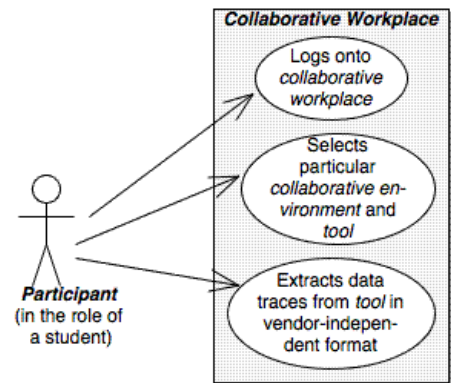


Figure 3: Use case 2 (with student)

Annex B (informative)

Alphabetical list of terms

The following terms defined in Clause 3 of ISO/IEC 19778-1:2007 are used in this Standard. The respective term numbers are provided in the right column.

Term	Defined in
Aggregating Element	3.1.1
collaborative effect	3.2.2
collaborative environment	3.2.3
collaborative function	3.2.4
collaborative group	3.2.5
collaborative service	3.2.6
collaborative tool	3.2.7
collaborative workplace	3.2.8
Data Element	3.1.5
Data Element datatype	3.1.6
Data Model	3.1.7
Data Model Element	3.1.8
Data Model Element definition	3.1.10
Data Model Element designation	3.1.11
Data Model Element identifier	3.1.12
Data Model Element instantiation	3.1.13
Data Model Element multiplicity	3.1.14
Data Model Element obligation status	3.1.15
Data Model instantiation	3.1.16
mandatory	3.1.17
optional	3.1.18
participant	3.2.9
role	3.2.10