D3.2 Approaches for integrating best practices content

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1. Introduction

1.1 Scope

This deliverable is a report on alternatives of approaches that are used to integrate digital content related to good/best practices; taking user needs into account.This deliverable presents the design and specification of the metadata schemas to be used for the description and classification of the main information resources of the DigiSkills Inventory. More specifically, it describes a metadata schema that will be used correspondingly for the description and classification of educational resources: *Good Practices* that promote ICT enabled learning using innovative teaching and learning practices. The deliverable aims to provide the project's technical development team with a specification of the data models required for storing the metadata in the DigiSkills Inventory, in order to facilitate the design of its database.

Metadata plays an important role in online repositories with learning resources, since it can make search, retrieval and access faster, easier and more effective. Learning resources standards like IEEE Learning Object Metadata (LOM) and Dublin Core (DC) will be explored for integrating the best practice content, collected from heterogeneous providers and collections, into the DigiSkills Inventory. In this context, a variety of reasons urge using a recognized metadata standard when particularly developing a repository with learning resources for educational purposes it is important to take into consideration the variety of special requirements that have to be reflected in the metadata. This calls for the implementation of both standard-based and also context-specialized educational metadata in such repositories. To this direction, the present report described the metadata schema that will be developed to support an online repository that supports good practices for education. The proposed schema is based on IEEE LOM and Dublin Core.

1.2 Audience

This report is mainly addressed to the people involved in the technical implementation of the DigiSkills Inventory. In addition it may be relevant to every individual interested in publishing online digital content related to Good / Best Practices that can support learning community and where users will be able to find, exchange and adapt innovative teaching and learning practices and exchange ideas.

2. Rationale

2.1 Content Objects in DigiSkills Inventory

The DigiSkills project aims to bring together and further develop content, services, pedagogies and practices for lifelong learning in school/university/adult population, formulating specific scenarios of use of learning tools and platforms. DigiSkills platform will enable this population to upload and share good practices for promoting innovative teaching and learning practices.

2.2 Good practices

A number of good practices will be developed to support the training scenarios of the project, including different types of educational material. Several focus groups will create a significant number of good/best practices that are expected to be uploaded in DigiSkills Inventory and stored as electronic files in the form of Word documents, PDF documents and others. They will be developed to support the training scenarios of all participating countries, and will be available in English. All these digital resources will be uploaded in the database of the DigiSkills platform, and will be made available to all interested users.

To facilitate searching, locating and downloading appropriate resources, the characteristics of the Good/Best Practices have to be briefly reflected in their descriptions. In this way, users can simply go through the various descriptions, and select the most appropriate resources for their needs, instead of downloading each file and checking for their appropriateness.

2.3 Importance of descriptions

As mentioned before, well-structured descriptions may help users in searching, browsing, locating and accessing the resources that best match their needs. That is, they may view the most important characteristics of the Good/Best Practices that will be listed in the DigiSkills Inventory in order to decide which to view or access, without needing to actually download or visit the resources forehands.

The way to represent and store their characteristics in an appropriate format is by using metadata. Generally speaking, metadata is information about information – that is, it is used to reflect important information about information resources. To achieve having this information in a structured manner, well-specified metadata schema is used. In the case of DigiSkills Good Practices, the medatada schema to be developed is based on existing metadata standards. This will facilitate the reusable and interoperable storage of the DigiSkills Good Practices' descriptions. In the sections to follow, we introduce the concepts of metadata and metadata schemas, and we present the detailed specification of the metadata schema used in the context of DigiSkills Inventory.

3. Metadata Models and Application Profiles

The aim of this chapter is to introduce the concept of metadata and to review existing metadata models for online resources and services. More specifically, to review generic as well as domain-specific metadata standards and specifications that have been proposed for the description and classification of online information resources.

3.1 Definition of Metadata

Metadata is usually termed as 'data about data' or 'information about information'[1]. The term "meta" comes from a Greek word that denotes "alongside, with, after, next". It is generally engaged for describing properties of information resources, in order to facilitate their categorization, storage, search and retrieval (Miller, 1996) in digital collections. In recent years, several open metadata standards have been emerged. If metadata is stored in a structured and standardized manner, it may generally support the automation of search and retrieval mechanisms, the comparison between descriptions of different resources, the reusability of descriptions in different applications, as well as the interoperability between different storage systems. Metadata is made up of data items that are associated to the resource, the so called elements designed for a specific purpose, such as describing a particular type of resource. Metadata specifications are well-defined and widely agreed metadata schemas that are expected to be adopted by the majority of implementers in a particular domain or industry. When a specification is widely recognized and adopted by some standardization, it then becomes a metadata standard.

A *metadata scheme* (or *schema*) is a structured description about the characteristics and properties of a type of information resources and allows the creation of catalogues and indexes. It is a tree-like data structure that consists of metadata elements (or sub-elements) storing the characteristics and properties. It also facilitates searching and comparing descriptions of different information resources and, as a consequence, the automation of search mechanisms. In the library environment, metadata is commonly used for any formal scheme of resource description, applying to any type of object, digital or non-digital. Other metadata schemes have been developed to describe various types of textual and non-textual objects including published books, electronic documents, archival finding aids, art objects, educational and training materials, and scientific datasets.

3.2 Use of Metadata

An important reason for creating descriptive metadata is to facilitate discovery of relevant information. In addition to resource discovery, metadata can help organize electronic resources, facilitate interoperability and legacy resource integration, provide digital identification, and support archiving and preservations (NISO, 2004). A metadata record consists of a set of attributes or elements, necessary to describe the resource. The advantages of tagging documents with metadata are as follows:

- It makes search, acquisition, and use of learning objects easier by the learner

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[1] NISO, "Understanding Metadata", National Information Standards Organisation, NISO Press, 2004.

- It enables the retrieval module of a retrieval system to retrieve personalized learning objects for an individual learner. It helps the tutoring module of a tutoring system in the tutoring processes.

- It facilitates reusability of learning objects i.e. the learning objects can be reused in different instructional contexts.

- It facilitates interoperability of learning objects i.e. the sharing and the exchange of learning objects across any technology supported learning system

3.2.1 Resource Discovery

Metadata serves the same functions in resource discovery as good cataloging does by:

- allowing resources to be found by relevant criteria;
- identifying resources;
- bringing similar resources together;
- distinguishing dissimilar resources;
- giving location information.

3.2.2 Organizing Electronic Resources

As the number of Web-based resources grows exponentially, aggregate sites or portals are increasingly useful in organizing links to resources based on audience or topic. Such lists can be built as static webpages, with the names and locations of the resources "hardcoded" in the HTML. However, it is more efficient and increasingly more common to build these pages dynamically from metadata stored in databases. Various software tools can be used to automatically extract and reformat the information for Web applications.

3.2.3 Interoperability

Describing a resource with metadata allows it to be understood by both humans and machines in ways that promote interoperability. Interoperability is the ability of multiple systems with different hardware and software platforms, data structures, and interfaces to exchange data with minimal loss of content and functionality. Using defined metadata schemes, shared transfer protocols, and crosswalks between schemes, resources across the network can be searched more seamlessly.

Two approaches to interoperability are cross-system search and metadata harvesting[2]. The Z39.50[3] protocol is commonly used for cross-system search. Z39.50 implementers do not share metadata but map their own search capabilities to a common set of search attributes. A contrasting approach taken by the Open Archives

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[2] **Metadata Harvesting** – the process of extracting metadata from individual repositories and collecting it in a central catalog

[3] http://www.loc.gov/z3950/agency/

Initiative[4] is for all data providers to translate their native metadata to a common core set of elements and expose this for harvesting. A search service provider then gathers the metadata into a consistent central index to allow cross-repository searching regardless of the metadata formats used by participating repositories.

3.2.4 Digital Identification

Most metadata schemes include elements such as standard numbers to uniquely identify the work or object to which the metadata refers. The location of a digital object may also be given using a file name, URL (Uniform Resource Locator), or some more persistent identifier such as a PURL (Persistent URL) or DOI (Digital Object Identifier). Persistent identifiers are preferred because object locations often change, making the standard URL (and therefore the metadata record) invalid. In addition to the actual elements that point to the object, the metadata can be combined to act as a set of identifying data, differentiating one object from another for validation purposes.

3.2.5 Preservation metadata

Preservation metadata is an essential component of most digital preservation strategies. As an increasing proportion of the world's information output shifts from analog to digital form, it is necessary to develop new strategies to preserve this information for the long-term. Preservation metadata is information that supports and documents the digital preservation process. Preservation metadata is sometimes considered a subset of technical or administrative metadata.

Preservation metadata stores technical details on the format, structure and use of the digital content, the history of all actions performed on the resource including changes and decisions, the authenticity information such as technical features or custody history, and the responsibilities and rights information applicable to preservation actions.

Preservation metadata is access-centered and should accomplish four themes: include details about files and instructions for use; document all updates or actions that have occurred to an object; show provenance and demonstrate current and future custody; list details on the individual(s) who are responsible for the preservation of the object.

Preservation metadata often includes the following information:
- *Provenance:* Who has had custody/ownership of the digital object?
- *Authenticity*: Is the digital object what it purports to be?
- *Preservation activity:* What has been done to preserve the digital object?
- *Technical environment:* What is needed to render, interact with and use the digital object?
- *Rights management:* What intellectual property rights must be observed?

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[4] http://www.openarchives.org/

Digital materials require constant maintenance and migration to new formats as technology changes. In order to survive into the future, digital objects need preservation metadata that can exist independently from the systems which were used to create them. Without preservation metadata, digital material will be lost. "While a print book with a broken spine can be easily re-bound, a digital object that has become corrupted or obsolete is often impossible (or prohibitively expensive) to repair". Preservation metadata provides the vital information which will make "digital objects self-documenting across time."

Preservation metadata is a new and developing field. The Reference Model for an Open Archival Information System (OAIS) is a broad conceptual model which many organizations have followed in developing new preservation metadata element sets. Early projects in preservation metadata in the library community include CEDARS, NEDLIB, The National Library of Australia and the OCLC/RLG Working Group on Preservation Metadata. Following on from this work, the Preservation Metadata: Implementation Strategies (PREMIS) Working Group created the "Data Dictionary for Preservation Metadata: Final Report of the PREMIS Working Group" which was released in May 2005[5]. The ongoing work of maintaining, supporting, and coordinating future revisions to the PREMIS Data Dictionary is undertaken by the PREMIS Editorial Committee, hosted by the Library of Congress. [6]

3.3 Common Metadata Schemes

Metadata schemas generally specify names of elements and their semantics. Optionally, they may specify:
- rules for how content must be formulated (for example, how to identify the main title),
- representation rules for content (for example, capitalization rules), and
- allowable content values (for example, terms must be used from a specified controlled vocabulary).

Many metadata schemas are being developed in a variety of user environments and disciplines. Some of the most common ones are listed below:

3.3.1 Information Resource Description

— **DUBLIN CORE** (http://dublincore.org/)

The Dublin Core metadata terms are a set of vocabulary terms which can be used to describe resources for the purposes of discovery. The terms can be used to describe a full range of web resources (video, images, web pages, etc.), physical resources such as books and objects like artworks. The full set of Dublin Core metadata terms can be found on the Dublin Core Metadata Initiative (DCMI) website (http://dublincore.org/documents/dces/). Dublin Core Metadata can be used for multiple purposes, from simple resource description, to combining metadata

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[5] http://www.oclc.org/en-europe/home.html?redirect=true

[6] http://en.wikipedia.org/wiki/Preservation_metadata

vocabularies of different metadata standards, to providing interoperability for metadata vocabularies in the Linked data cloud and Semantic web implementations.

DCMI Metadata Terms (http://dublincore.org/documents/dcmi-terms/)

Including:
- The Dublin Core Metadata Element Set
- Other Elements and Element Refinements
  http://dublincore.org/documents/dcmi-terms/#H3
- Encoding Schemes
- The DCMI Type Vocabulary

The Dublin Core Metadata Element Set is a standard for cross-domain information resource description. It is now a U.S. national and international standard.

— **MARC** (MAchine-Readable Cataloging)
  http://lcweb.loc.gov/marc/

MARC provides the mechanism by which computers exchange, use, and interpret bibliographic information, and its data elements make up the foundation of most library catalogs used today. MARC became USMARC in the 1980s and MARC 21 in the late 1990s.

— **MODS** (Metadata Object Description Schema)
  http://www.loc.gov/standards/mods/

MODS includes a subset of MARC fields and uses language-based tags rather than numeric ones, in some cases regrouping elements from the MARC 21 bibliographic format. MODS is expressed using the XML schema language of the World Wide Web Consortium.

3.3.2 Cultural Objects and Visual Resources

— **Categories for the Description of Works of Art (CDWA)**
  http://www.getty.edu/research/conducting_research/standards/cdwa/index.html
A standard for describing works of art, architecture, groups of objects, and visual and textual surrogates.

— **VRA Core Categories version 3.0**
  http://www.vraweb.org/projects/vracore3/
It is used for creating records to describe works of visual culture as well as the images that document them.

— **VRA Core Categories version 4.0**
  http://www.vraweb.org/projects/vracore4/index.html

3.3.3 Educational-purpose

— **Learning Object Metadata (LOM)** http://ltsc.ieee.org/wg12/index.html
Focuses on the minimal set of attributes needed to allow learning objects to be

managed, located, and evaluated. Learning Objects are defined here as any entity, digital or non-digital, which can be used, re-used or referenced during technology supported learning.

3.3.4 Archives and Preservation

— **EAD (Encoded Archival Description) DTD** http://lcweb.loc.gov/ead/

A standard for encoding archival finding aids using Extensible Markup Language (XML).

— **PREMIS (Preservation Metadata: Implementation Strategies)** http://www.oclc.org/research/projects/pmwg/

Defines "core" set of preservation metadata elements, with supporting data dictionary, applicable to a broad range of digital preservation activities

3.4.5 E-Commerce

— **The INDECS project** http://www.indecs.org/

The <indecs> metadata framework: Principles, model and data dictionary http://www.indecs.org/pdf/framework.pdf

Created to address the need, in the digital environment, to put different creation identifiers and their supporting metadata into a framework where they could operate side by side, especially to support the management of intellectual property rights. The main focus of <indecs> is the use of what is commonly (if imprecisely) called content or intellectual property.

— **ONIX (Online Information Exchange)** http://www.editeur.org/onix.html

Built on the <indecs> Framework, developed and maintained by EDItEUR jointly with book industries.   The ONIX for Books Product Information Message is the international standard for representing and communicating book industry product information in electronic form. It has elements to record a wide range of evaluative and promotional information as well as basic bibliographic and trade data.

3.4.6 Agents

— **The Friend of a Friend (FOAF)** http://xmlns.com/foaf/0.1/

The foaf project homepage: http://www.foaf-project.org/

The FOAF project is based around the use of machine readable Web homepages for people, groups, companies, etc. The "FOAF vocabulary" provides a collection of basic terms that can be used in these Web pages.

— **RDF-vCARD**

Representing vCard Objects in RDF/XML http://www.w3.org/TR/vcard-rdf

This note specifies a Resource Description Framework (RDF) expression that corresponds to the vCard electronic business card profile defined by RFC 2426 [VCARD].

3.4.7 Geospatial Data

— **Content Standards for Digital Geospatial Metadata (CSDGM)**

http://www.fgdc.gov/metadata/csdgm/index_html

A standard for supporting the collection and processing of geospatial metadata. It is intended to be useable by all levels of government and the private sector.

3.4.8 Media-Specific

MPEG-4 and MPEG-7 for Audio and Video (ISO/IEC standards developed by [MPEG (Moving Picture Experts Group)](#))

— **MPEG-4**
A standard for multimedia of the fixed and mobile web.
Overview: http://www.chiariglione.org/mpeg/standards/mpeg-4/mpeg-4.htm

— **MPEG-7**
A standard for description and search of audio and visual content. = Multimedia Content Description Interface Overview: http://www.chiariglione.org/mpeg/standards/mpeg-7/mpeg-7.htm

3.4.9 An expanded list of metadata element sets and application profiles

3.4.9.1 Information Resource Description

— **MARC** (MAchine-Readable Cataloging) http://lcweb.loc.gov/marc/
MARC provides the mechanism by which computers exchange, use, and interpret bibliographic information, and its data elements make up the foundation of most library catalogs used today. MARC became USMARC in the 1980s and MARC 21 in the late 1990s.

— **MODS** (Metadata Object Description Schema)
http://www.loc.gov/standards/mods/
MODS includes a subset of MARC fields and uses language-based tags rather than numeric ones, in some cases regrouping elements from the MARC 21 bibliographic format. MODS is expressed using the XML schema language of the World Wide Web Consortium.

— **MARC XML** http://www.loc.gov/marcxml
A framework for working with MARC data in a XML environment.

— **DUBLIN CORE** http://dublincore.org/

Dublin Core Metadata Element Set: http://dublincore.org/documents/dces/

DCMI Metadata Terms:http://dublincore.org/documents/dcmi-terms/

Including:

- The Dublin Core Metadata Element Set
- Other Elements and Element Refinements http://dublincore.org/documents/dcmi-terms/#H3
- Encoding Schemes
- The DCMI Type Vocabulary

— **ISO Standard 15836-2003** (February 2003):
http://www.niso.org/international/SC4/n515.pdf

— **NISO Standard Z39.85-2001** (September 2001):
http://www.niso.org/standards/resources/Z39-85.pdf

— **DC-Education Application Profile**
http://www.ischool.washington.edu/sasutton/dcmi/ed/04-05/DC-Education_AP_11-30-04.html
Clarifies the use of the DC Metadata Element Set in education and training-related applications and projects.

— **DC-Library Application Profile** (DC-Lib)
http://dublincore.org/documents/library-application-profile/
A proposed application profile that clarifies the use of the Dublin Core Metadata Element Set in libraries and library-related applications and projects.
— **DC Government Application Profile**
http://dublincore.org/documents/2001/09/17/gov-application-profile/
Clarifies the use of Dublin Core in a Government context.

— **GILS** (Government Information Locator Service/Global Information Locator Service) http://www.access.gpo.gov/su_docs/gils/index.html
Metadata Elements http://www.gils.net/elements.html

— **RFC 1807** (Format for Bibliographic Records)
http://www.faqs.org/rfcs/rfc1807.html A format for bibliographic records describing technical reports.

— **TEI Headers** (Text Encoding Initiative) http://www.tei-c.org/
An international standard for representing various literary and linguistic texts for online research and teaching.

— **W3C PICS** (Platform for Internet Content Selection) http://www.w3.org/PICS/
Enables labels (metadata) to be associated with Internet content. It was originally designed to help parents and teachers control what children access on the Internet, but it also facilitates other uses for labels, including code signing and privacy. The PICS platform is one on which other rating services and filtering software have been built.

3.4.9.2 Cultural Objects and Visual Resources

— **Categories for the Description of Works of Art** (CDWA) http://www.getty.edu/research/institute/standards/cdwa/index.html
A standard for describing works of art, architecture, groups of objects, and visual and textual surrogates.

- o CDWA Lite: XML Schema Content for Contributing Records via the OAI Harvesting Protocol (Version 1.1) http://www.getty.edu/research/conducting_research/standards/cdwa/cdwalite.html
  An XML schema to describe core records for works of art and material culture based on the CDWA and the CCO.
- o FDA/ADAG Guide to the Description of Architectural Drawings http://www.getty.edu/research/conducting_research/standards/fda/
  This Guide includes additional data categories and rules regarding architectural drawings.

— **Cataloging Cultural Objects (CCO)** http://www.vraweb.org/ccoweb/cco/index.html
Cataloging Cultural Objects: A Guide to Describing Cultural Works and Their Images (CCO) is a manual for describing, documenting, and cataloging cultural works and their visual surrogates. This is a fuller, more prescriptive set of cataloging rules for a critical subset of the CDWA subcategories. CCO maps to the CDWA core and VRA Core 4.0 metadata element sets.

— **VRA Core Categories** 3.0
http://www.vraweb.org/projects/vracore3/
For creating records to describe works of visual culture as well as the images that document them.

— **VRA Core Categories version 4.0**
http://www.vraweb.org/projects/vracore4/index.html

— **NISO Data Dictionary for Technical Metadata for Digital Still Images**
http://www.niso.org/committees/committee_au.html

- • http://www.niso.org/standards/resources/Z39_87_trial_use.pdf
  Presents a comprehensive list of technical data elements required to manage digital image collections
- • NISO Metadata for Images in XML Schema (MIX) http://www.loc.gov/standards/mix/
  An XML schema for a set of technical data elements required to manage digital image collections.

— **OBJECT ID**
http://www.object-id.com/index.html
Object ID Checklist: http://www.object-id.com/checklist/check_eng.html
Developed to help to combat art theft by encouraging use of the standard and by bringing together organizations around the world that can encourage its implementation. It is a small subset of the CDWA categories.

— **IPTC Metadata** for Adobe's XMP (Extensible Metadata Platform) framework (IPTC4XMP) -- "IPTC Core" Schema for XMP

http://www.iptc.org/cms/site/index.html?channel=CH0099

IPTC metadata were employed by Adobe Systems Inc. to describe photos already in the early nineties. A subset of the IPTC "Information Interchange Model - IIM" was adopted as the well known "IPTC Headers" for Photoshop, JPEG and TIFF image files which currently describe millions of professional digital photos.

— **CHIN Data Dictionary**: **Humanities.** Canadian Heritage Information Network. http://daryl.chin.gc.ca:8000/BASIS/chindd/user/wwwhe/SF

The CHIN Data Dictionaries contain a description of database fields for museum collection and archaeological site management and documentation. They can be used by a wide range of museums to help them to identify their institution's information needs and standardize their documentation.

3.4.10 Educational-purpose

— **Learning Object Metadata** (LOM) http://ltsc.ieee.org/wg12/index.html
IEEE 1484.12.1-2002, 15 July 2002
Focuses on the minimal set of attributes needed to allow learning objects to be managed, located, and evaluated. Learning Objects are defined here as any entity, digital or non-digital, which can be used, re-used or referenced during technology supported learning.

— **CanCore** http://www.cancore.ca/en/
Guidelines for the Access For All Digital Resource Description http://www.cancore.ca/guidelines/drd/
These guidelines are the product of three years of consultation with implementers across Canada and internationally. The guidelines are synchronized with the IEEE LOM standard, and include best practice recommendations for all LOM elements.

— **GEM Element Set**, The Gateway to Educational Materials
http://64.119.44.148/about/documentation/metadataElements
GEM is a set of metadata standards used by several Consortium members to organize and improve access to their own educational materials.

— **DC-Ed** (Dublin Core Education Working Group) Extensions
http://dublincore.org/groups/education/
The scope of the Working Group interests includes metadata for the discovery, use, and management of resources applicable within and among many national and cross-sector education communities (e.g., pre-school, K-12, further and higher education, vocational and technical training, and lifelong learning).

— **DC-Education Application Profile**

http://projects.ischool.washington.edu/sasutton/dcmi/DC-EdAP-7-18-06.html
Proposes an application profile that clarifies the use of the Dublin Core Metadata Element Set in education and training-related applications and projects.

— **The Sharable Content Object Reference Model** (SCORM)
http://www.adlnet.org/index.cfm?fuseaction=scormabt
Defines a Web-based learning "Content Aggregation Model" and "Run-Time Environment" for learning objects. The SCORM is a collection of specifications adapted from multiple sources to provide a comprehensive suite of e-

learning capabilities that enable interoperability, accessibility and reusability of Web-based learning content.

> **ETD-MS**: an Interoperability Metadata Standard for Electronic Theses and Dissertations.

http://www.ndltd.org/standards/metadata/current.html
A standard set of metadata elements based on the Dublin Core, used to describe electronic theses and dissertations.

3.4.11 Archives and Preservation

⸺ **EAD** (Encoded Archival Description) DTD
http://lcweb.loc.gov/ead/
A standard for encoding archival finding aids using Extensible Markup Language (XML).

⸺ **PREMIS** (Preservation Metadata: Implementation Strategies)
http://www.oclc.org/research/projects/pmwg/
Data Dictionary for Preservation Metadata
 http://www.oclc.org/research/projects/pmwg/premis-final.pdf
Defines "core" set of preservation metadata elements, with supporting data dictionary, applicable to a broad range of digital preservation activities

⸺ **Reference Model for an Open Archival Information System** (OAIS)
http://public.ccsds.org/publications/archive/650x0b1.pdf
A technical recommendation for use in developing a broader consensus on what is required for an archive to provide permanent, or indefinite long-term, preservation of digital information.

⸺ **Recordkeeping Metadata Standard for Commonwealth Agencies**
http://www.naa.gov.au/recordkeeping/control/rkms/contents.html
Describes the metadata that the National Archives of Australia recommends should be captured in the recordkeeping systems used by Commonwealth government agencies.

3.4.12 E-commerce and Right Management

⸺ **The INDECS project** http://www.indecs.org/
The <indecs> metadata framework: Principles, model and data dictionary
http://www.indecs.org/pdf/framework.pdf
Created to address the need, in the digital environment, to put different creation identifiers and their supporting metadata into a framework where they could operate side by side, especially to support the management of intellectual property rights. The main focus of <indecs> is the use of what is commonly (if imprecisely) called content or intellectual property.

⸺ **ONIX** (Online Information Exchange) http://www.editeur.org/onix.html
Built on the <indecs> Framework, developed and maintained by EDItEUR jointly with book industries. The ONIX for Books Product Information Message is the international standard for representing and communicating book industry product

information in electronic form. It has elements to record a wide range of evaluative and promotional information as well as basic bibliographic and trade data.

— **Publishing Requirements for Industry Standard Metadata** (PRISM)
http://www.prismstandard.org/specifications/
The specification defines an XML metadata vocabulary for syndicating, aggregating, post-processing, and multi-purposing magazine, news, catalog, book, and mainstream journal content.
The scope of the PRISM Specification was driven by the needs of publishers to receive, track, and deliver multi-part content. The focus is on additional uses for the content, therefore metadata concerning the content's appearance is outside PRISM's scope. The working group focused on metadata for:

- General-purpose description of resources as a whole
- Specification of a resource's relationships to other resources
- Definition of intellectual property rights and permissions
- Expressing inline metadata (that is, markup within the resource itself).

— **DOI** -- Digital Object Identifier, by the International DOI Foundation
A system for identifying and exchanging intellectual property in the digital environment. It provides a framework for managing intellectual content, for linking customers with content suppliers, for facilitating electronic commerce, and for enabling automated copyright management for all types of media.

3.4.13 Agents

— **FOAF** (The Friend of a Friend) http://xmlns.com/foaf/0.1

The foaf project homepage: http://www.foaf-project.org/
The FOAF project is based around the use of machine readable Web homepages for people, groups, companies, etc. The "FOAF vocabulary" provides a collection of basic terms that can be used in these Web pages.

— **RDF-vCARD**
Representing vCard Objects in RDF/XML
http://www.w3.org/TR/vcard-rdf
This note specifies a Resource Description Framework (RDF) expression that corresponds to the vCard electronic business card profile defined by RFC 2426 [VCARD].

3.4.14 Geospatial Data

— **Content Standards for Digital Geospatial Metadata** (CSDGM)
http://www.fgdc.gov/metadata/csdgm/index_html
A standard for supporting the collection and processing of geospatial metadata. It is intended to be useable by all levels of government and the private sector.

- o Biological Data Profile of the Content Standard for Digital Geospatial Metadata http://www.fgdc.gov/metadata/geospatial-metadata-standards
  Maintained by the Federal Geographic Data Committee (FGDC)

A user-defined or theme-specific profile of the FGDC Content Standard for Digital Geospatial Metadata for the purpose of increasing its utility for documenting biological resources. This standard serves as the metadata content standard for the National Biological Information Infrastructure (NBII)

— **ISO 19115 Core Metadata Elements**

An International Metadata Standard for Geographic Information http://www.iso.org/iso/en/CatalogueDetailPage.CatalogueDetail?CSNUMBER=26020&ICS1=35&ICS2=240&ICS3=70
Defines the schema required for describing geographic information and services. It provides information about the identification, extent,quality, spatial and temporal schema, spatial reference, and distribution of digital geographic data.

3.4.15 Media-Specific

MPEG-4 and **MPEG-7** for Audio and Video (ISO/IEC standards developed by MPEG (Moving Picture Experts Group))

— **MPEG-4**

(A standard for multimedia of the fixed and mobile web.)
Overview http://www.chiariglione.org/mpeg/standards/mpeg-4/mpeg-4.htm

— **MPEG-7**

(A standard for description and search of audio and visual content.)
= Multimedia Content Description Interface
Overview http://www.chiariglione.org/mpeg/standards/mpeg-7/mpeg-7.htm

— **PBCore**

The Public Broadcasting Metadata Dictionary http://www.utah.edu/cpbmetadata/ Created by the public broadcasting community in the USA for use by public broadcasters and related communities. The PBCore is built on the foundation of the Dublin Core.

— **Standard Media Exchange Framework** (SMEF),

BBC SMEF Data Model http://www.bbc.co.uk/guidelines/smef/
Provides a set of definitions for the information required in production, distribution and management of media assets, currently expressed as a data dictionary and set of Entity Relationship Diagrams.

3.4.16 Collection Level Description

— **EAD** (Encoded Archival Description) DTD

http://lcweb.loc.gov/ead/
A standard for encoding archival finding aids using Extensible Markup Language (XML).

— **Z39.50 Profile for Access to Digital Collection**

("Z39.50" refers to the International Standard, ISO 23950: "Information Retrieval (Z39.50): Application Service Definition and Protocol Specification", and to ANSI/NISO Z39.50) http://lcweb.loc.gov/z3950/agency/markup/markup.html
The protocol addresses communication between corresponding information retrieval applications, the client and server (which may reside on different computers).

3.4.17 Internet Computing

— **CORBA** (Common Object Request Broker Architecture)
http://www.omg.org/technology/documents/corba_spec_catalog.htm

- Specification of an architecture for middleware technology called an Object Request Broker that provides interoperability among clients and servers distributed over a heterogeneous environment.
- " Using the standard protocol IIOP, a CORBA-based program from any vendor, on almost any computer, operating system, programming language, and network, can interoperate with a CORBA-based program from the same or another vendor, on almost any other computer, operating system, programming language, and network." Source: http://www.omg.org/gettingstarted/corbafaq.htm

3.4.18 Numeric Data

— **ICPSR Data Documentation Initiative** (DDI)
http://www.icpsr.umich.edu/DDI/CODEBOOK/index.html
An international XML-based standard for the content, presentation, transport, and preservation of documentation for datasets in the social and behavioral sciences.

— **Standard for Survey Design and Statistical Methodology Metadata** (SDSM)
 The Bureau of the Census
http://www.census.gov/srd/www/metadata/ASA96TOC.HTML
Defines the necessary metadata to describe all aspects of survey design, processing, analysis, and data sets.

3.5 IEEE LOM and Dublin Core

Several educational metadata schemata have been proposed over time in order to better characterize learning objects. A widely adopted metadata element set for this purpose is IEEE LOM, a standard which has been designed especially for the description of educational resources. According to Al-Khalifa and Davis[7], an important feature of LOM is that it is simple to use and has an inherent extension capability. This extensibility allows for the easy incorporation of new elements and enables LOM to meet the specific needs of applications.
The IEEE Learning Object Metadata aims to develop accredited technical standards, recommended practices, and guides for learning technology. This standard specifies

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[7] Al-Khalifa, H., & Davis, H. (2006). The evolution of metadata from standards to semantics in E-learning applications. In *Proc. of the 17th ACM Conference on Hypertext and Hypermedia*.

learning object metadata. It specifies a conceptual data schema that defines the structure of a metadata instance for a learning object. For this standard, a learning object is defined as any entity digital or non-digital that may be used for learning, education or training. For this standard, a metadata instance for a learning object describes relevant characteristics of the learning object to which it applies. Such characteristics are grouped in General, Life cycle, Meta-metadata, Educational, Technical, Rights Relation, Annotation, and Classification categories. It is intended to reference by other standards that define the implementation descriptions of the data schema so that a metadata instance for a learning object can be used by a learning technology system to manage, locate, evaluate or exchange learning objects. The complete LOM element hierarchy is presented in Figure 1.
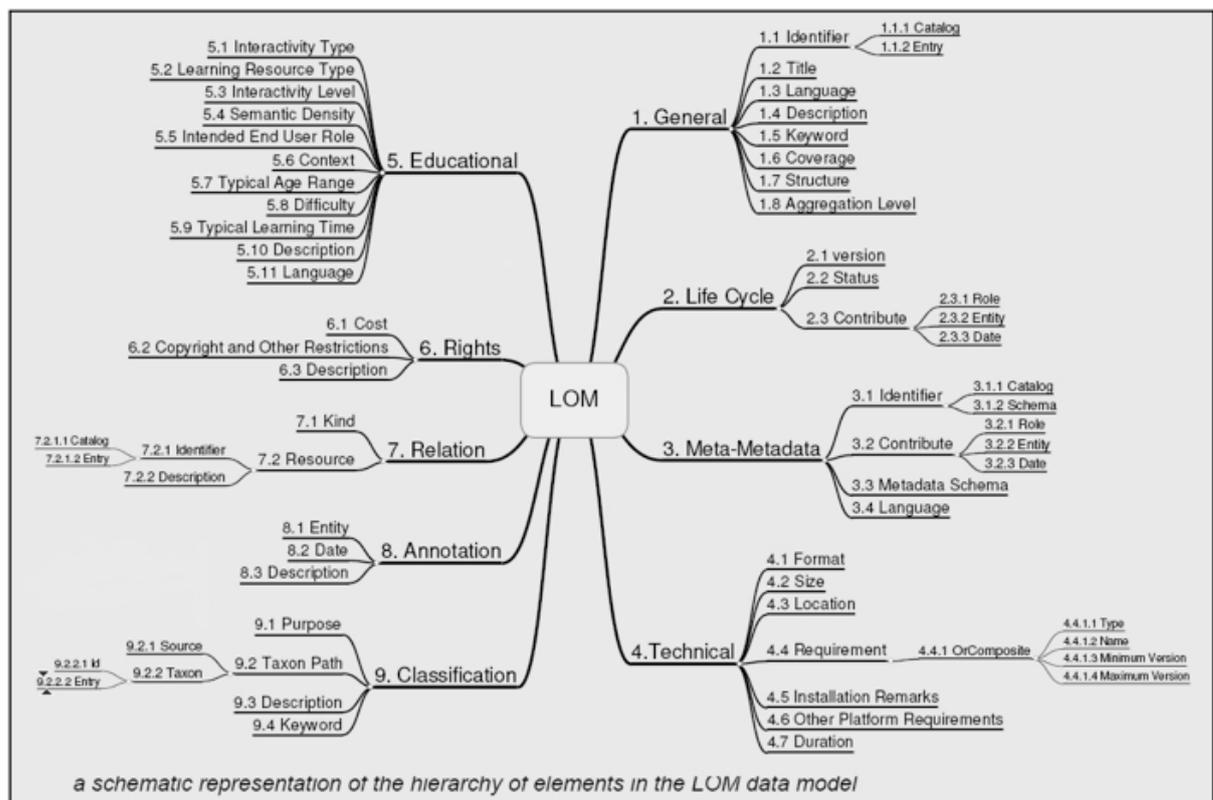
Figure 1. LOM metadata standard schema

The Dublin Core Metadata Initiative is an open forum engaged in the development of interoperable online metadata standards that supports a broad range of purposes and business models. The Dublin Core standard includes two levels: Simple and Qualified.

The simple Dublin Core contains fifteen elements. The elements are

1. Title
2. Subject
3. Description
4. Type
5. Source
6. Relation
7. Coverage
8. Creator

9. Publisher
10. Contributor
11. Rights
12. Date
13. Format
14. Identifier
15. Language

The qualified Dublin Core includes three additional elements
1. Audience
2. Provenance
3. RightsHolder

as well as a group of element refinements (also called qualifiers) that refine the semantics of the elements in a way that may be useful in resource discovery. The Dublin Core metadata contains metadata elements useful for general purpose applications but it does not contain attributes describing the pedagogical perspective of a document.

IEEE LOM	Dublin Core Metadata
1. General	1. Contributor
1.1 Identifier	2. Coverage
1.2 Catalog	3. Creator
1.3 Entry	4. Date
1.4 Title	5. Description
1.5 Language	6. Format
1.6 Description	7. Identifier
1.7 Keyword	8. Language
1.8 Coverage	9. Publisher
1.9 Structure	10. Relation
1.10 Aggregation Level	11. Rights
2. Life Cycle	12. Source
2.1 Version	13. Subject
2.2 Status	14. Title
2.3 Contribute	15. Type
2.4 Role	
2.5 Entity	
2.6 Date	
3 Meta-Metadata	
3.1 Identifier	
3.2 Catalog	
3.3 Entry	
3.4 Contribute	
3.5 Role	
3.6 Entity	
3.7 Date	
3.8 Metadata Schema	
3.9 language	
4. Technical	
4.1 Format	
4.2 Size	
4.3 Location	
4.4 Requirement	
4.5 OrComposite	
4.6 Type	
4.7 Name	
4.8 Min Version	

4.9 Max Version	
4.10 Installation Remarks	
4.11 Other Platform Requirements	
4.12 Duration	
5. Educational	
5.1 Learning Resource Type	
5.2 Interactivity Level	
5.3 Semantic Density	
5.4 Intended End User Role	
5.5 Context	
5.6 Typical Age Range	
5.7 Difficulty	
5.8 Typical Learning Time	
5.9 Description	
5.10 Language	
6. Rights	
6.1 Cost	
6.2 Copyright & other restrictions	
6.3 Description	
7. Relation	
7.1 Kind	
7.2 Resource	
7.3 Identifier	
7.4 Catalog	
7.5 Entry	
7.6 Description	
8 Annotation	
8.1 Entity	
8.2 Date	
8.3 Description	
9. Classification	
9.1 Purpose	
9.2 Taxon Path	
9.3 Source	
9.4 Taxon	
9.5 Id	
9.6 Entry	
9.7 Description	
9.8 Keyw	

Table 1. IEEE LOM and Dublin Core Metadata

Apart from LOM and Dublin Core, other well known metadata schemas designed to serve similar needs in the field of education are IMS[8], ARIADNE[9]. Their basic characteristics are summarized in Table 2.

NAME	CHARACTERISTICS
IMS	• A further work on IEEE LOM • Elements can be mapped to DC

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[8] IMS, http://www.imsproject.org/

[9] ARIADNE, http://www.ariadne-eu.org/

ARIADNE	• A set of 47 elements, 27 of which can be directly mapped to LOM elements
	• Organized in six categories: *General, Semantics, Pedagogical, Technical, Indexation, Annotation*
	• Fully compatible with IEEE LOM

Table 2. IMS and ARIADNE characteristics

4. DigiSkills Inventory Metadata Application Profile

After the extensive review of existing metadata standards and application profiles, it is apparent that IEEE LOM constitutes a solution for the characterization of educational resources. By incorporating this schema inside a repository specific to educational purposes, like DigiSkills Inventory, we see how it can be utilized in practice, and how it contributes to the efficient description and retrieval of Good/Best practices. This chapter presents the metadata application profile that is used for the description of the Good Practices for DigiSkills Inventory based on Table 1. More specifically, it presents the Good Practices specializations of two selected metadata standards: IEEE LOM and Dublin Core. These have been selected by the DigiSkills technical and content teams, to facilitate the description and classification of Good Practices that will be uploaded to the DigiSkills Inventory.

4.1 DigiSkills IEEE LOM Application Profile

This section provides a detailed description of the elements and sub-elements metadata application profile model for the description of the Good Practices of DigiSkills Inventory.

4.1.1 General

This category includes elements that describe a Good Practice and store general information about it such as title, description, keyword etc.

Title: It refers to the name that is given to this Good Practice. It will contain a text string with the title of the resource.

Language: The primary human language or languages used within this Good Practice to communicate to the intended user. It takes values from a pre-defined vocabulary of languages, such as the ISO 639-1:2002 (e.g. 'en' for English).

Description: A description of the content of this Good Practice. It is used as proposed by IEEE LOM. It will contain a free text string with the description of the resource.

Keyword: A keyword or phrase describing the topic of this Good Practice. It will contain a text string. This data element should not be used for characteristics that can be described by other data elements.

4.1.2 Life-cycle

This category describes the history and current state of the Good Practice and the entities that have affected this Good Practice during its evolution. It

includes a number of sub-elements from which the following one has been selected as appropriate for DigiSkills Inventory implementation needs.

Version: It stores a unique descriptor that denotes the version/edition of the Good Practice. It is used as proposed by IEEE LOM and contains a text string with the version of the Good Practice (e.g. 'Second edition').

Date: It is intended for the date of contribution

Status: The completion status or condition of this Good Practice. It is used as proposed by IEEE LOM. It takes values from a pre-defined vocabulary (e.g. draft, final, revised, unavailable).

Contribute: element provides information about those entities (i.e., people, organizations) that have contributed to the state of this Good Practice during its life cycle (e.g., creation, edits, publication).

- **Role:** Role of the contributor, e.g. author, editor etc.
- **Entity:** The identification of and information about entities (i.e., people, organizations) contributing to this Good Practice. The entities shall be ordered as most relevant first. Only the *name*, *address*, *telephone* and *e-mail* attributes of the vCard specification (Dawson and Howes, 1998) will be used, for example:

  BEGIN:VCARD
  EA
  ADDR: Dimitriou Panagea st, Pallini;Athens; 15351;Greece
  tel: "+30 210 81767999
  EMAIL;tzikopoulos@ea.gr
  END:VCARD\n
- **Date:** The date of the contribution. Dates in this element are represented according to W3C-DTF (http://www.w3.org/TR/NOTE-datetime) format YYYY-MM-DD. (e.g. '2006-08-23').

4.1.3 Technical

This category describes the technical requirements and characteristics of this Good Practice.

Format: Technical datatype(s) of (all the components of) this Good Practice. This data element shall be used to identify the software needed to access the Good Practice. It takes values from MIME types as defined in RFC2048:1996 (Freed et al., 1996), for example: *application/msword* for Microsoft's Word documents, *text/html* for html pages etc.

Size: The size of the digital Good Practice in bytes (octets). The size is represented as a decimal value (radix 10). It takes values from the ISO/IEC 646:1991, but only the digits "0" through "9" should be used. The unit is bytes, not Mbytes, GB, etc. This data element shall refer to the actual size of this Good Practice. If the Good

Practice is compressed, then this data element shall refer to the uncompressed size.

Location: A string that is used to access this Good Practice. This element describes the location of the resource within the repository. It contains a text string and it will be automatically generated by the system. For internal resources that show at local directory (e.g. C:/MyComputer/Resources.GoodPractice1.pdf). For external at the url (e.g. http://digiskills-project.ea.gr/inventory/GoodPractice1.pdf).

Other Platform Requirements: Information about other software and hardware requirements. It is used as proposed by IEEE LOM. It will contain a text string (e.g. 'to hear the narrative a sound card is needed')

4.1.4 Educational

This category describes the key educational or pedagogic characteristics of this Good Practice.

Learning Resource Type: Specific kind of Good Practice. The most dominant kind shall be first. It takes values from a pre-defined vocabulary (e.g. exercise, simulation, questionnaire, diagram etc).

Intended End User Role: Principal user(s) for which this Good Practice was designed, most dominant first. It is an IEEE LOM element, especially adapted for DigiSkills LOM. It is expected to take values from a predefined vocabulary (e.g. teacher, author, learner, etc)

Context: The principal environment within which the learning and use of this Good Practice is intended to take place. It is an IEEE LOM element, especially adapted for DigiSkills LOM. It is expected to take values from a predefined vocabulary (e.g. school or vocational training).

Typical Age Range: The age of the typical intended user of the Good Practices for which this approach applies. This data element shall refer to developmental age, if that would be different from chronological age. It is used as the IEEE LOM proposes and contains a text string (e.g. university).

Difficulty: How hard it is to work with or through this Good Practice for the typical intended target audience. It is used as the IEEE LOM proposes. It takes values from a pre-defined vocabulary (e.g. very easy, easy, medium, difficult, very difficult).

Typical Learning Time: Approximate or typical time it takes to work with or through this Good Practice for the typical intended target audience. This value space will contain a text string based on ISO 8601:2004, e.g. 'PT2H15M' for a typical learning time of 2 hours and 15 minutes.

4.1.5 Rights

This category describes the intellectual property rights and conditions of use for this Good Practice. For this, it consists of the following sub-elements:

Cost: reflects whether use of this resource requires payment (yes/no).

Copyrights and Other Restrictions: reflects whether copyright or other restrictions apply to the use of this resource (yes/no).

4.2 Specification of DigiSkills Inventory LOM elements

Element	Explanation	Size	Value space /[Scheme]	Definition of Value space /Description	Datatype	M/O
1. General	Groups the general information that describes a Good Practice as a whole.	1	-	-	-	M
1.2 Title	Name given to this Good Practice.	1	ISO/IEC 10647	-	LangString (SPM: 1000 char)	M
1.3 Language	The primary human language or languages used within this Good Practice to communicate to the intended user.	1	ISO 639-1	European Languages	CharacterString (SPM: 30 char)	M
1.4 Description	A textual description of the content of this Good Practice.	1	ISO/IEC 10647	-	LangString (SPM: 2000 char)	M
1.5 Keyword	A keyword or phrase describing the topic of this Good Practice.	SPM: 10 items.	ISO/IEC 10647	-	Vocabulary	M
2. Life Cycle	Describes the history and current state of this Good Practice and those entities that have affected this Good Practice during its evolution.	1	-	-	-	M
2.1 Version	The edition of this Good Practice.	1	ISO 10646	-	Langstring (SPM: 50 char)	O

Element	Explanation	Size	Value space /[Scheme]	Definition of Value space /Description	Datatype	M/O
2.2 Status	The completion status or condition of this Good Practice	1	draft final revised unavailable	-	Vocabulary	O
2.3 Contribute	Those entities (i.e., people, organizations) that have contributed to the state of this Good Practice during its life cycle (e.g., creation, edits, publication).	SPM: 30 items	-	-	-	O
2.3.1 Role	Kind of contribution	1	author publisher unknown validator editor subject matter expert annotator NOTE1:"annotator" is the entity that makes comments for a Good Practice	-	Vocabulary (State)	O
2.3.2 Entity	The identification of and information about entities contributing to this Good Practice. The entities shall be ordered as most relevant first.	SPM: 40 items	vCard, as defined by IMC vCard 3.0 (RFC 2425, RFC 2426).	BEGIN:VCARD\n EA ADDR: Dimitriou Panagea st, Pallini;Athens; 15351;Greece tel: "+30 210 81767999 EMAIL;tzikopoulos@ea.gr END:VCARD\n	-	O

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Element	Explanation	Size	Value space /[Scheme]	Definition of Value space /Description	Datatype	M/O
2.3.3 Date	The date of the contribution.	1	W3C-DTF	yyyy-mm-dd (where: YYYY = four-digit year MM = two-digit month (01=January, etc.) DD = two-digit day of month (01 through 31))	Date	O
4. Technical	This category describes the technical requirements and characteristics of this Good Practice.	1	-	-	-	O
4.1 Format	Technical datatype(s) of (all the components of) this Good Practice. This data element shall be used to identify the software needed to access the Good Practice.	SPM: 40 items	MIME types based on IANA registration (see RFC2048:1996) or "non-digital"	automated	CharacterString (SPM: 30 char)	O

Element	Explanation	Size	Value space /[Scheme]	Definition of Value space /Description	Datatype	M/O
4.2 Size	The size of the digital Good Practice in bytes. The size is represented as a decimal value (radix 10). Consequently, only the digits "0" through "9" should be used. The unit is bytes, not Mbytes, GB, etc. This data element shall refer to the actual size of this Good Practice. If the Good Practice is compressed, then this data element shall refer to the uncompressed size.	1	ISO/IEC 646:1991, but only the digits "0".. "9"	automated	CharacterString (SPM: 30 char)	O
4.3 Location	A string that is used to access this Good Practice. It may be a location (e.g., Universal Resource Locator), or a method that resolves to a location (e.g., Universal Resource Identifier). The first element of this list shall be the preferable location. NOTE: This is where the Good Practice described by this metadata instance is physically located.	SPM: 10 items	ISO/IEC 10646	For internal resources shows at local directory (C:/MyComputer/ Resources.GoodPractice1.pdf). For external at the url (http://digiskills-project.ea.gr/inventory/GoodPractice1.pdf)	CharacterString (SPM: 1000 char)	O
4.4 Other Platform Requirements	Information about other software and hardware requirements. NOTE: This element is intended for descriptions of requirements that cannot be expressed by data element 4.4:Technical.Requirement.	1	ISO/IEC 10646	-	LangString (SPM: 1000 char)	O

Element	Explanation	Size	Value space /[Scheme]	Definition of Value space /Description	Datatype	M/O
5. Educational	This category describes the key educational or pedagogic characteristics of this Good Practice. NOTE: This is the pedagogical information essential to those involved in achieving a quality learning experience. The audience for this metadata includes teachers, managers, authors, and learners.	1	-	-	-	M
5.1 Learning Resource Type	Specific kind of Good Practice. The most dominant kind shall be first. NOTE: The vocabulary terms are defined as in the OED:1989 and as used by educational communities of practice.	SPM: 10 items	exercise simulation questionnaire diagram figure graph index slide table narrative text exam experiment problem statement self assessment lecture	Vocabulary (State)	Vocabulary	M

Element	Explanation	Size	Value space /[Scheme]	Definition of Value space /Description	Datatype	M/O
5.2 Intended End User Role	Principal user(s) for which this Good Practice was designed, most dominant first. NOTE 1: A teacher works with a Good Practice in order to learn something. An author creates or publishes a Good Practice. A manager manages the delivery of this Good Practice, e.g., a university or college. The document for a manager is typically a curriculum.	SPM: 10 items	teacher author learner manager	Vocabulary (State)	Vocabulary	M
5.3 Context	The principal environment within which the learning and use of this Good Practice is intended to take place. NOTE: Suggested good practice is to use one of the values of the value space and to use an additional instance of this data element for further refinement, as in ("LOMv1.0","higher education")	SPM: 10 items	school training higher education other	Vocabulary (State)	Vocabulary	M

Element	Explanation	Size	Value space /[Scheme]	Definition of Value space /Description	Datatype	M/O
5.4 Typical Age Range	Age of the typical intended user. This data element shall refer to developmental age, if that would be different from chronological age. NOTE 1:--The age of the learner is important for finding Good Practices, especially for school age learners and their teachers. When applicable, the string should be formatted as minimum age-maximum age or minimum age-. (NOTE:--This is a compromise between adding three component elements (minimum age, maximum age, and description) and having just a free text field.)	SPM: 5 items	ISO /IEC 1646	-	Langstring (smallest permitted maximum: 1000 char)	O
5.5 Difficulty	How hard it is to work with or through this Good Practice for the typical intended target audience. NOTE: The "typical target audience" can be characterized by data elements 5.6:Educational.Context and 5.7:Educational.TypicalAgeRange.	1	very easy easy medium difficult very difficult	Vocabulary (State)	Vocabulary (Enumerated)	O

Element	Explanation	Size	Value space /[Scheme]	Definition of Value space /Description	Datatype	M/O
5.6 Typical Learning Time	Approximate or typical time it takes to work with or through this Good Practice for the typical intended target audience. NOTE: The " typical target audience" can be characterized by data elements 5.6:Educational.Context and 5.7:Educational.TypicalAgeRange.	SPM: 10 items	ISO 8601:2004	-	CharacterString (SPM: 1000 char)	O
6. Rights	This category describes the intellectual property rights and conditions of use for this Good Practice. NOTE: The intent is to reuse results of ongoing work in the Intellectual Property Rights and ecommerce communities. This category currently provides the absolute minimum level of detail only.	1	-	-	-	M
6.1 Cost	Whether use of this Good Practice requires payment.	1	yes no	-	Vocabulary	O
6.2 Copyright and Other Restrictions	Comments on the conditions of use of this Good Practice.	1	yes no	-	Vocabulary	M

4.3 Example of Use

The following example shows an indicative example of how the elements of the DigiSkills LOM Application Profile can be used for the description of a sample Good Practice in DigiSkills Inventory.

Element	Example
1. General	-
1.1 Title	"Good Practice for using Wiki in Secondary School"
1.2 Language	"Greek"
1.3 Description	"Those training materials have been developed in support of a course of Geography in Secondary School"
1.4 Keywords	Wiki, secondary, web 2.0 tools
2. Life Cycle	-
2.1 Version	«Second edition» «Revised edition»
2.2 Date	"2013-09-24"
2.3 Status	"revised"
2.4 Contribute	-
2.4.1 Role	"author"
2.4.2 Entity	BEGIN:VCARD EA ADDR: Dimitriou Panagea st, Pallini;Athens; 15351;Greece tel: "+30 210 81767999 EMAIL;tzikopoulos@ea.gr END:VCARD
2.4.3 Date	"20013-05-23"
3. Technical	-
3.1 Format	"application/msword"
3.2 Size	30000000
3.3 Location	"http://digiskills-project.ea.gr/inventory/GoodPractice1.pdf"
3.6 Other Platform Requirements	"To play the video you need software for videos"
4. Educational	-
4.1 Learning Resource Type	"video"
4.2 Intended End User Role	"teacher"
4.3 Context	"training"
4.4 Typical Age	"22+"

Element	Example
Range	
4.5 Difficulty	"easy"
4.6 Typical Learning Time	PT2M45S
5. Rights	-
5.1 Cost	"no"
5.2 Copyright and Other Restrictions	"yes"

4.4 Template for Good Practices

One use of DigiSkills Inventory is to upload Good/ Best Practices of all forms (e.g. learning of a best practice, assessment resources used to assess the practice). In order to be more accessible and easier searchable the Good/ Best practices must have a specific template. The template for the collection of Good Practices will based on the above example with some more extra information. Below is the final template for Good Practices for DigiSkills Inventory. The fields with the red star are mandatory in order to upload successfully a good practice. The rest ones are optional.

GENERAL DATA	
TITLE OF THE GOOD PRACTICE *	
NAME OF CREATOR *	
POSITION AND TASK OF THE AUTHOR *	
FURTHER DETAILS: INSTITUTION/ EMAIL/WEBSITE	
EDUCATIONAL LEVEL: SE/HE/AE *	
COUNTRY/ LANGUAGE *	
KEYWORDS (tags) *	
DATE (TIME/DURATION)	
DESCRIPTION	
SHORT INTRODUCTION *	
TARGET GROUPS *	

TYPICAL AGE RANGE	
SHORT DESCRIPTION OF THE CHALLENGE FACED	
TYPICAL LEARNING TIME	
AIM	
DESCRIPTION OF THE SOLUTION/S DEVELOPED OR ADOPTED *	
DIFFICULTY	
TOPICS OF GOOD PRACTICES *	**ICT enabled learning** **Community Building** **Quality and Assessment**
CRITERIA (click on the appropriate boxes, please) *****	<table><tr><td>Transferable</td><td></td><td>Adaptability</td><td></td></tr><tr><td>Innovative</td><td></td><td>Acceptability</td><td></td></tr><tr><td>Impact</td><td></td><td>Actual</td><td></td></tr><tr><td>Sustainability</td><td></td><td>Effectiveness</td><td></td></tr><tr><td>Availability</td><td></td><td>Creativity</td><td></td></tr><tr><td>Accessibility</td><td></td><td>Collaborative</td><td></td></tr></table>
ACTIVITIES/IMPLEMENTATION *	
STATUS	
CONTRIBUTE	
RESOURCES (Optional): • Cost • Human resources • Infrastructures/material resources • Other resources (please, specify)	
TOOLS USED (Optional):	
LITERATURE REVIEW (Optional): (BIBLIOGRAPHY, VIDEOS, LINKS, OTHER PROJECTS)	
FORMAT *	
UPLOAD BEST PRACTICE (TEXT, PDF, ZIP) *	

VIDEO (link)	
IMAGE/SOUND	
SIZE	
LOCATION	
OTHER PLATFORMS REQUIRED	
COPYRIGHT *	
EVALUATION	

CRITERIA *	Transferable		Adaptability	
	Innovative		Acceptability	
	Impact		Actual	
	Sustainability		Effectiveness	
	Availability		Creativity	
	Accessibility		Collaborative	
	Others			

OVERALL RATING *	
COMMENTS *	

When an authorized user of the DigiSkills Inventory logged in, he/she will have the ability to upload a Good / Best Practice. A form with the fields of the template for collection of Good/ Best Practices will be appeared. For each field will be a specific way to be filled, i.e. the educational level will be chosen using radio buttons. Below you can find the type of each field of Good/ Best Practice that should be filled.

Title of the Good Practice: Free text

Name of Creator: Free text

Position and Task of the author: Free text

Further Details: Institution/e-mail/Website: Free text

Educational Level: SE/HE/AE: Radio Buttons

Country/ Language: Drop down menu/ Free text

Keywords (tags): Free text (separated with comma)

Date: YYYY-MM-DD

Short introduction: Free text

Target Groups:

Typical Age Range: Check list

Short description of the challenge faced: Free text

Typical learning time: Free text

AIM: Free text

Description of the solution/s developed of adopted: Free text

Difficulty: Drop down menu (very easy, easy, medium, difficult, very difficult)

Topics of Good Practices: Free text

Criteria: Check list

Activities/Implementation: Free text

Status: Drop down menu (draft, final, revised, unavailable)

Contribute: Free text

Resources: Free text

Tools used: Free text

Literature review: Free text

Format: Free text (doc, pdf, mp3, mp4, etc)

Upload Best Practice: Attachment button

Video: link

Image/Sound: Attachment button

Size: Number (bytes)

Location: Free text/url

Other platforms required: Free text

Copyright: Free text

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