

Standards in eLearning – an Overview

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Standards and Why We Need Them

Do you know your size?





Standards and Why We Need Them

Adult Men's and Women's Shoe Size

Europe	36	37	37½	38	38½	39	40	41	42	43
Japan Men	22.5	23	23.5	24	24.5	25	25.5	26	26.5	27.5
Japan Ladies	22	22.5	23	23.5	24	24.5	25	25.5	26	27
Mexico				4.5	5	5.5	6	6.5	7	7.5
Australia & U.K. Men	4	4½	5	5½	6	6½	7	7½	8	8½
U.K. Women	3½	4	4½	5	5½	6	6½	7	7½	8½
Australia Women	4½	5	5½	6	6½	7	7½	8	8½	9½
U.S. & Canada Men	4½	5	5½	6	6½	7	7½	8	8½	9
U.S. & Canada Women	6	6½	7	7½	8	8½	9	9½	10	10.5
Russia & Ukraine Women		35		36		37		38		39



Standards and Why We Need Them

Standards help to

- tear down barriers
 - establish semantic and technical interoperability
 - increase the freedom of choice
- Take the DIN A4 paper sheet format as an example



Kinds of Standards

There are standards and specifications:

- *de jure* standards
 - DIN (national standards)
 - CEN/ISSS (European standards)
 - ISO (international standards)
- specifications and *de facto* standards
 - W3C
 - IEEE
 - OASIS



Standards and Specifications Dealing with Metadata

Metadata is the most advanced area in terms of standardization of learning technologies

- There are several standards and specifications dealing with metadata
 - Dublin Core
 - Learning Object Metadata (LOM)
 - IMS Meta-data Specification



Standards and Specifications Dealing with Metadata

What is metadata?

- Data about data
- more precisely: data describing other data
- Attribute/value pairs

We distinguish between

- Syntax of metadata
- Semantics of metadata (metadata about special resources)



Standards and Specifications Dealing with Metadata

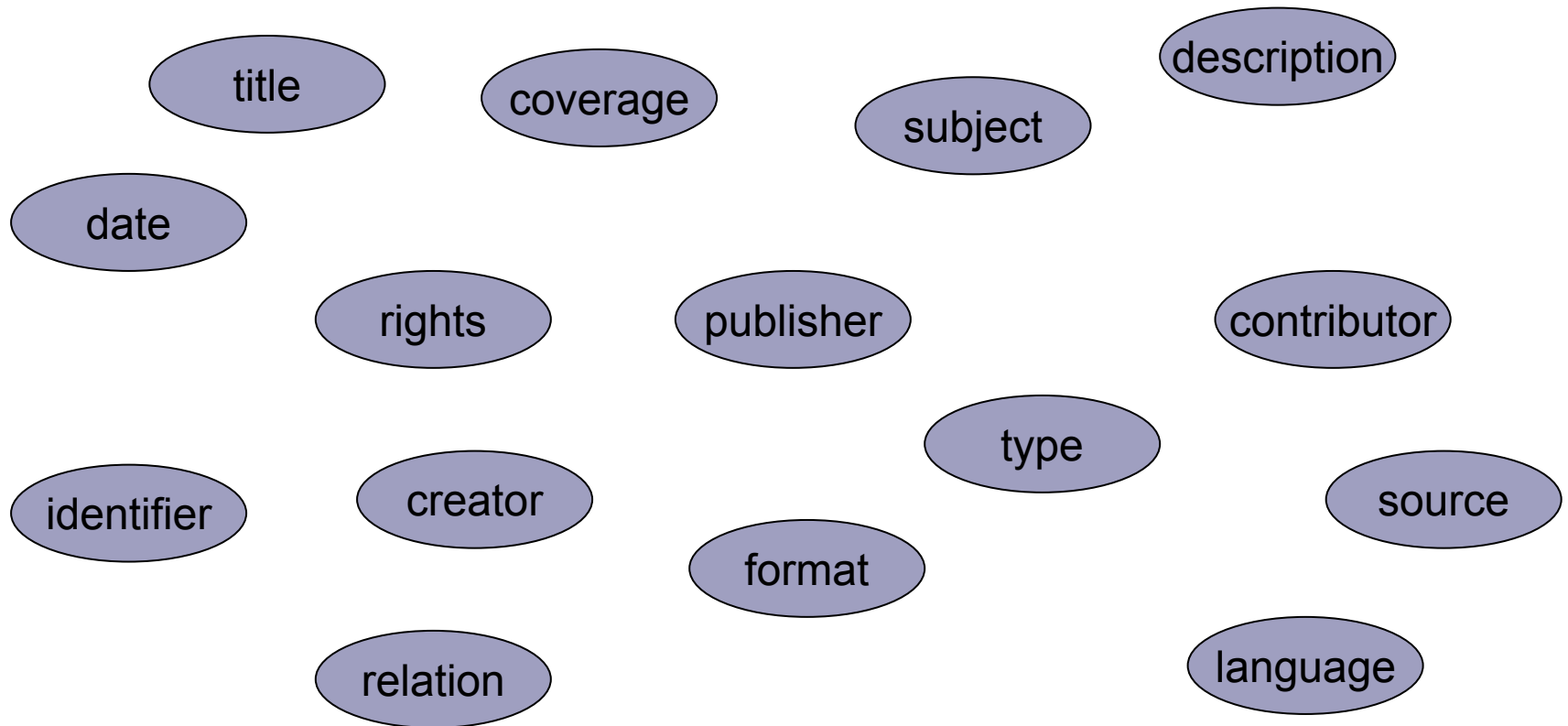
Dublin Core Metadata

- Dublin Core Metadata Initiative
- „Mother of all metadata specifications“
- ISO Standard
- Dublin Core Metadata Element Set
- Supplemental elements
- Arbitrary element order and occurrence



Standards and Specifications Dealing with Metadata

Dublin Core Metadata Element Set





Standards and Specifications Dealing with Metadata

Pros:

- Simplicity (usable for non-experts)
 - Semantic compatibility (beyond disciplines)
 - Internationally approved
 - Extensible
 - ISO standard
 - Compatible with RDF
- can be used in the web



Standards and Specifications Dealing with Metadata

Cons:

- Dublin Core is non-specific
 - Semantic compatibility
 - Arbitrary element order and occurrence
- Dublin Core has too few metadata elements – especially when dealing with eLearning content

eLearning metadata specifications



Standards and Specifications Dealing with Metadata

Learning Object Metadata (LOM)

- Institute of Electrical and Electronics Engineers (IEEE) Learning Technology Standards Committee
- IEEE P1484.12 Learning Object Metadata Working Group since 1999
- Official IEEE standard since 06/2002
- Derived from Dublin Core



Standards and Specifications Dealing with Metadata

Learning Object Metadata (LOM)

- Components for learning can be divided into
 - metadata
 - content itself (learning objects)
- Complex learning objects are composed of smaller learning objects
- **Modularity of content**
- *Everything* is a learning object – even non-digital resources (books, services, living persons)



Standards and Specifications Dealing with Metadata

The properties of a learning object are organized in nine categories:

- General
- Lifecycle
- Meta-Metadata
- Technical
- Educational
- Rights
- Relation
- Annotation
- Classification



Standards and Specifications Dealing with Metadata

Pros:

- Several metadata categories and elements
- Support of modular content
- High flexibility
- Extensible
- Adopted by numerous consortia



Standards and Specifications Dealing with Metadata

Cons:

- Very document-centric
- No content model
- Educational category is far from being complete
- Classification category is insufficient
- Up to now no official binding



Standards and Specifications Dealing with Metadata

IMS Meta-data Specification

- National Learning Infrastructure Initiative (NLII)
- IMS Project
- One of several specifications developed by IMS
 - IMS Content Packaging Specification
 - IMS Question & Test Interoperability Specification
 - IMS Learning Design



Standards and Specifications Dealing with Metadata

IMS Meta-data Specification

- Based on LOM
- Version 1.2.1 conforms to LOM WD 6.1 (05/2001)



Standards and Specifications Dealing with Metadata

Pros:

- Based on LOM
- XML binding available
- Coordination with other IMS specifications



Standards and Specifications Dealing with Metadata

Cons:

- XML binding not very sophisticated
- Additional expenditure for authors
- Only future versions will fully comply to official LOM XML binding and specification

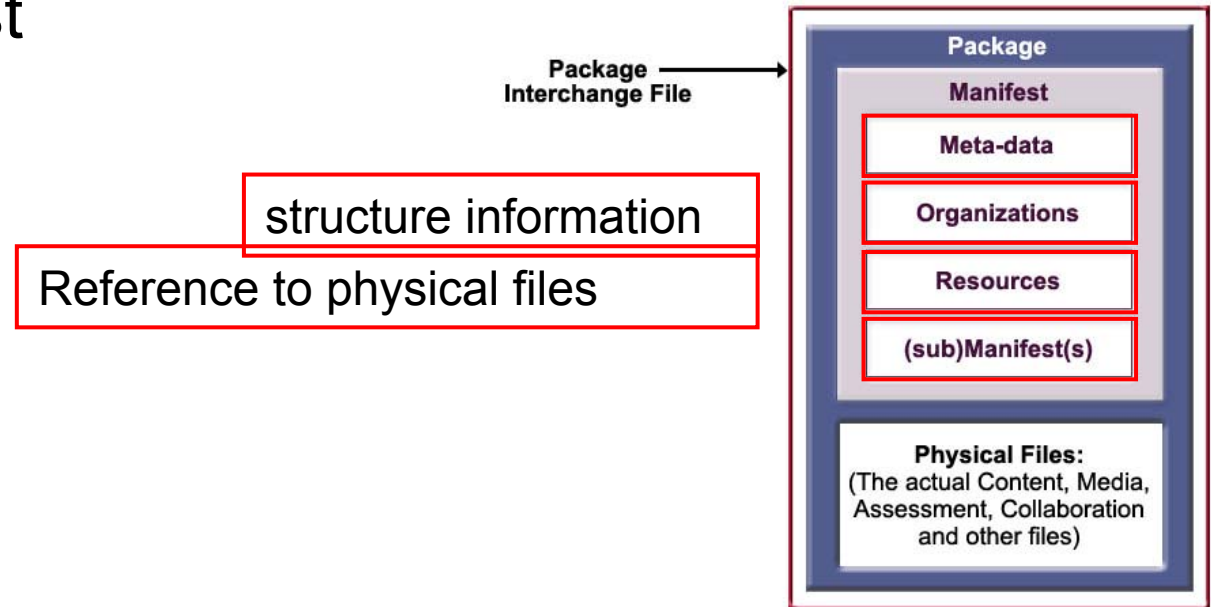


Other Specifications

- IMS Content Packaging Specification
- IMS Question & Test Interoperability
- ADL SCORM

IMS Content Packaging Specification

- Distribution and Exchange of learning objects
- XML manifest
- PIF





Other Specifications

Pros:

- Container format for exchange and distribution
- XML binding available
- Coordination with other IMS specifications



Other Specifications

Cons:

- Need of two additional files
 - Manifest file
 - Package Interchange file



Other Specifications

IMS Question & Test Interoperability Specification

- XML language for describing questions and tests
- Interoperability of content within assessment systems



Other Specifications

Pros:

- XML binding available
- Allows for the distribution of test items
- Coordination with other IMS specifications



Other Specifications

Cons:

- Specification is very complex
- huge overhead



Other Specifications

ADL SCORM

- Advanced Distributed Learning Initiative (US government, industry and universities)
- Sharable Content Object Reference Model
- Collection of several specifications, organized in „Books“
 - Book 1: Overview
 - Book 2: Content Aggregation Model
 - Book 3: Run-Time Environment

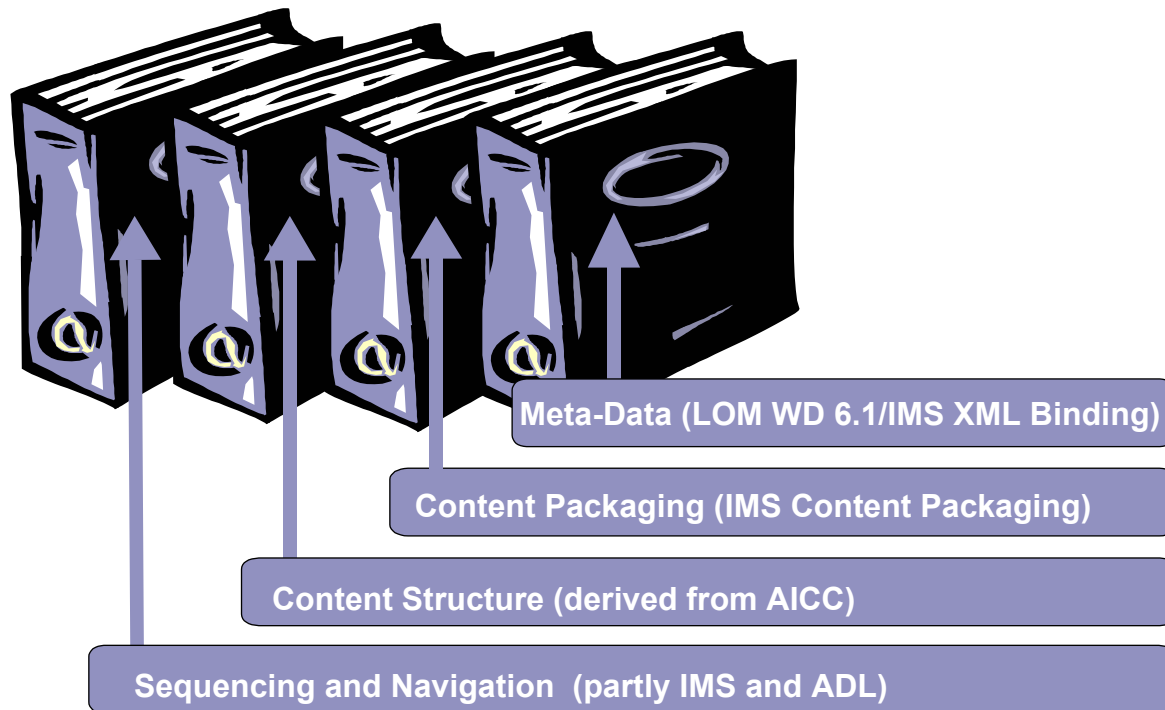


Other Specifications

Book 1: Overview

- „Model that *references* a set of interrelated technical specifications and guidelines“
- Combination of specifications developed by groups such as IMS, AICC, ARIADNE, IEEE LTSC

Book 2: SCORM Content Aggregation Model





Other Specifications

The SCORM Content Model consists of

- Assets (basic media, text)
- Sharable Object Content (SCO, collection of one or more Assets)
- Content Aggregation (content structure)



Other Specifications

SCORM Content Structure

- Course
 - Module 1
 - Lesson 1
 - Lesson 2
 - Module 2
 - Lesson 1
 - Lesson 2
 - Part 1
 - Assessment (Leistungsnachweis)

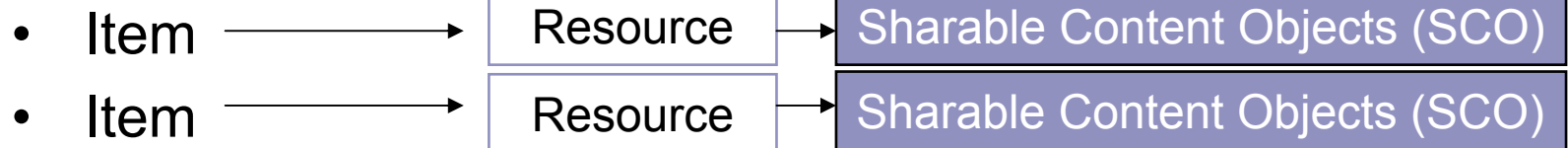


Other Specifications

SCORM Content Structure

- Organization

- Item



- Item



- Item





Other Specifications

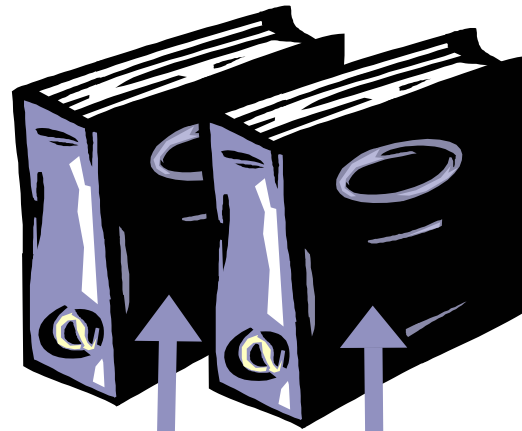
SCORM Sequencing and Navigation

- LMS specific rules
- Provides the means to conditionally branch from one learning resource to other learning resources
- Only a limited system of sequencing and navigation exists by now



Other Specifications

Book 3: SCORM Run-Time Environment



Data Model (from AICC)

Launch, Communication API (from AICC)



Other Specifications

SCORM Runtime Environment provides

- A common way to start learning resources
 - Launch
- A common mechanism for learning resources to communicate with an LMS
 - Application Program Interface (API)
- A predefined language or vocabulary forming the basis of communication
 - Data Model



Other Specifications

Pros:

- Integrative model
- XML bindings available



Other Specifications

Cons:

- Some specifications are outdated
- Interoperability problems possible
- Implementation very complex
(Run-Time Environment)

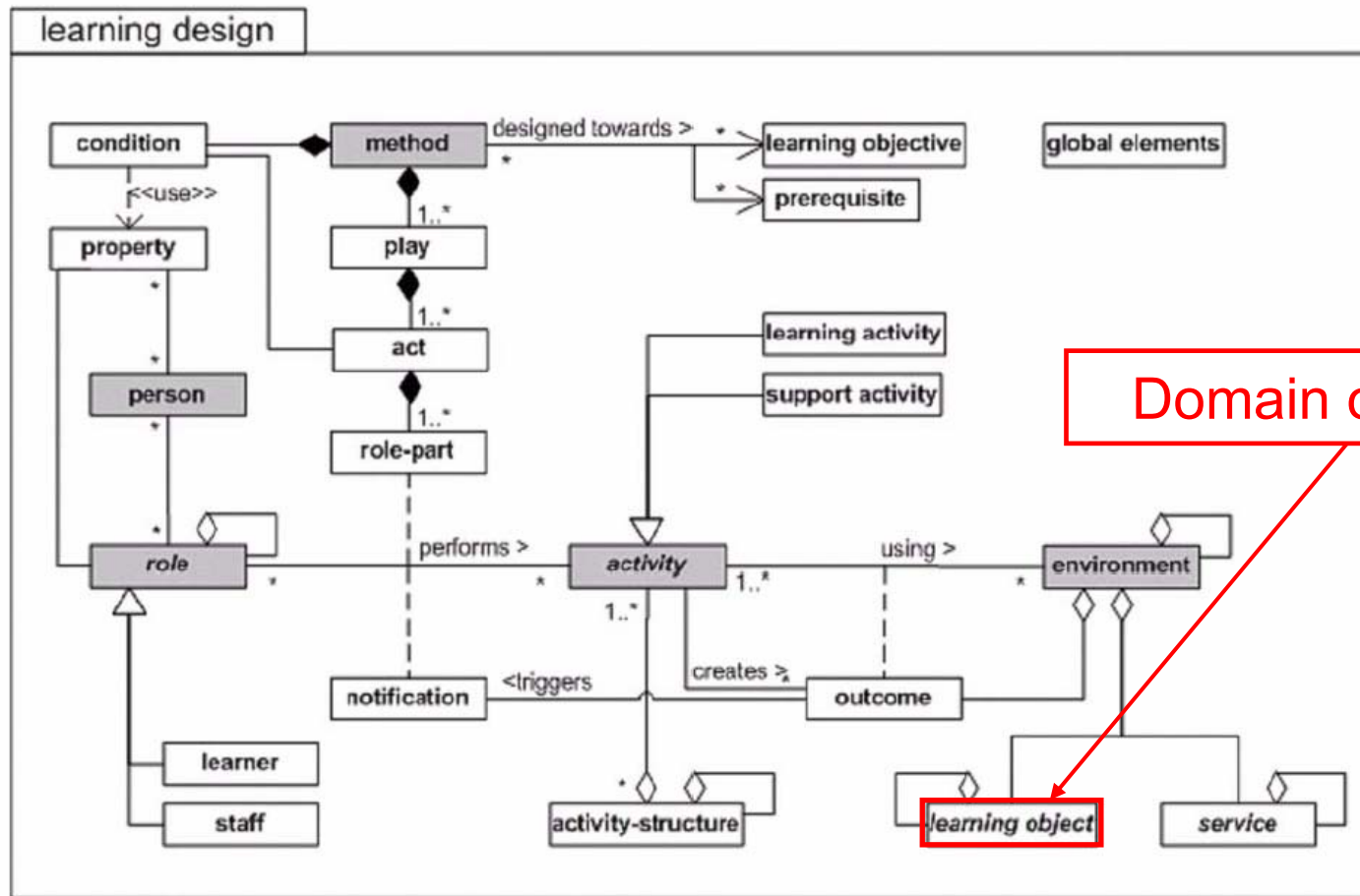


Other Specifications

IMS Learning Design

- Language for modeling units of study, describing a learning process
- Integration of the Educational Modeling Language (EML, Open University of the Netherlands) and existing IMS specifications
 - Content Packaging
 - Meta-data
 - Simple Sequencing

Other Specifications





Other Specifications

Pros:

- Integrative view of (e)learning
- Didactical and pedagogical concepts taken into account
- XML binding available



Other Specifications

Cons:

- Bleeding edge specification
- Some parts are subject to change in the future
- Very complex
- Some concepts are incomplete



Future Developments

- IMS Learning Design is the first step into the future of eLearning specifications
- Other specifications will follow
- DIN EBN Didactical Object



Conclusion

There are many different eLearning specifications

but

- In the field of metadata everything concentrates on LOM
- Recent developments target on integrative models, taking didactical concepts into account



Conclusion

and

none of the specifications contains a content model!



**Thank you very much for your
attention!**

