



Content Modeling for eLearning

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What is ‘educational content’?

- Educational material developed to be consumed in computer based learning using on-line web environments
- Educational material has embedded pedagogical & instructional information
- Complex specifications and a variety of description standards
- Complex authoring process and difficult to maintain

Educational Content: Current problems

- **Interoperability** → It is not possible to re-assemble content
- **Maintainability** → Difficulty to update content, authoring not independent from VLE
- **Reusability** → Content embedded in VLE and nor searchable or retrievable
- **Durability** → Do not recover from a deep change in the delivery format or content format

Lack of an abstraction level

Educational Content:

Abstraction Level

Technical issues

HTML tree, *.asp, form, GET/POST, ...



Pedagógical/Instructional

Module, Task, Sequence, Prerequisite,
Assignment, Exercise, Simulation, ...

Learning Content Specification

Lack of an appropriate abstraction level



- Provide specifications with associated operational semantic. Not related with delivery formats
- Provide pedagogical design elements
- Authoring tools should not be in VLE's but as standalone applications
- Make LO's interoperable and reusable

Learning Objects

- Interoperable educative content components labeled with Metadata
- Context independent → reusable
- Aggregation of LO's according to its aggregation level
- Repositories of LO's
 - ARIADNE (1997) → Development of LOM
 - Other projects: OASIS, CELEBRATE (IST E.U.)
- Authoring process based on selection and aggregation

Collection of LO's

- Repositories of LO's
 - Metadata + Search → CELEBRATE, ARIADNE..
 - Ontology-based model + Semantic Search → Conceptual Maps (PALO, others...)
- Aggregation levels (Complexity)
 - Simple Content (De-contextualized)
 - Complex content (Parsing needed → NOT in final delivery format)

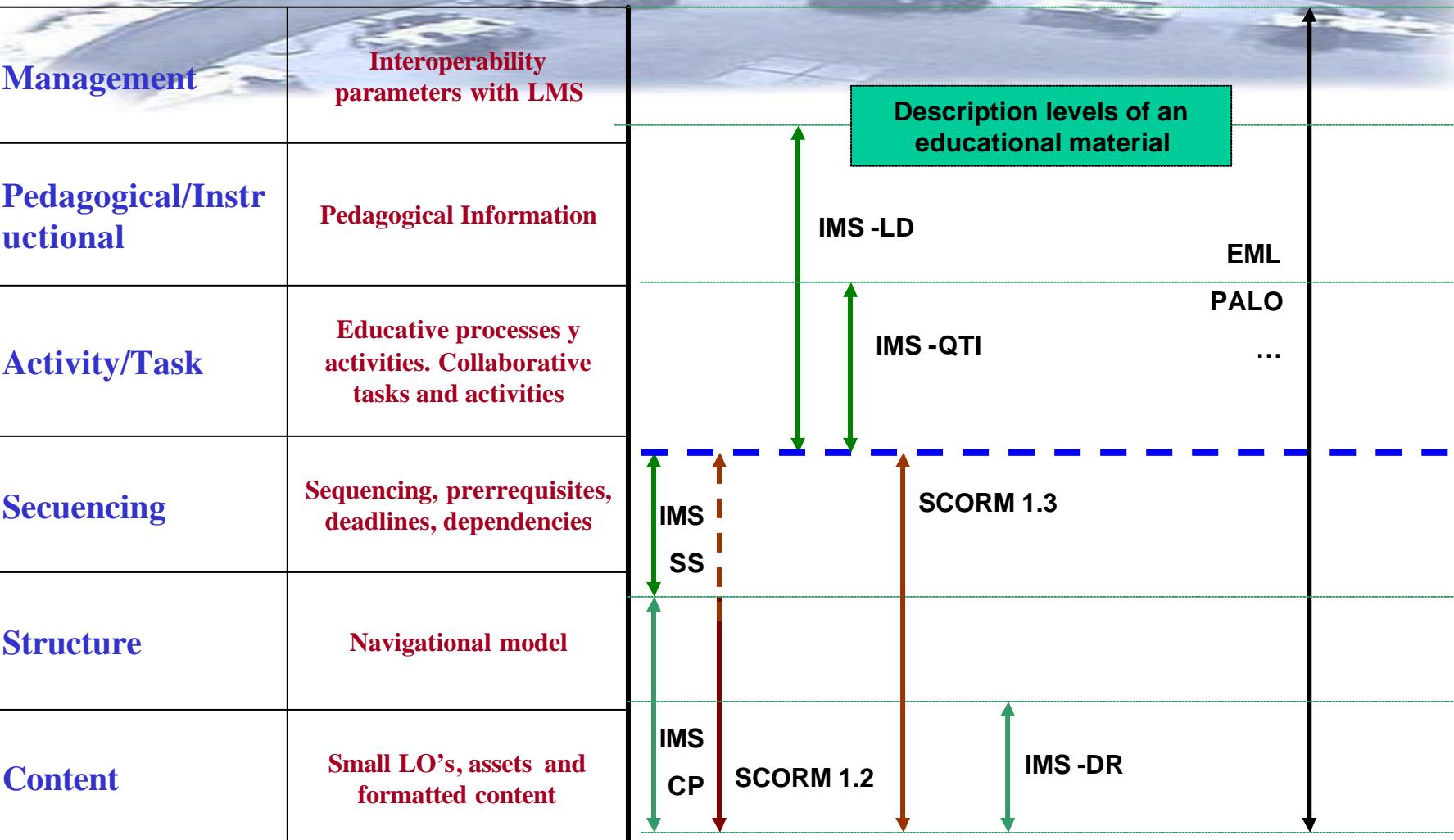
Drawbacks

- De-contextualized learning
 - Reusability vs. Aggregation level
 - Context vs. Interchangeability
- Lack of personalization
 - No adaptability to students
- Complex business model
 - Copyright restrictions
 - Known problems of distribution (KaZaA, ...)

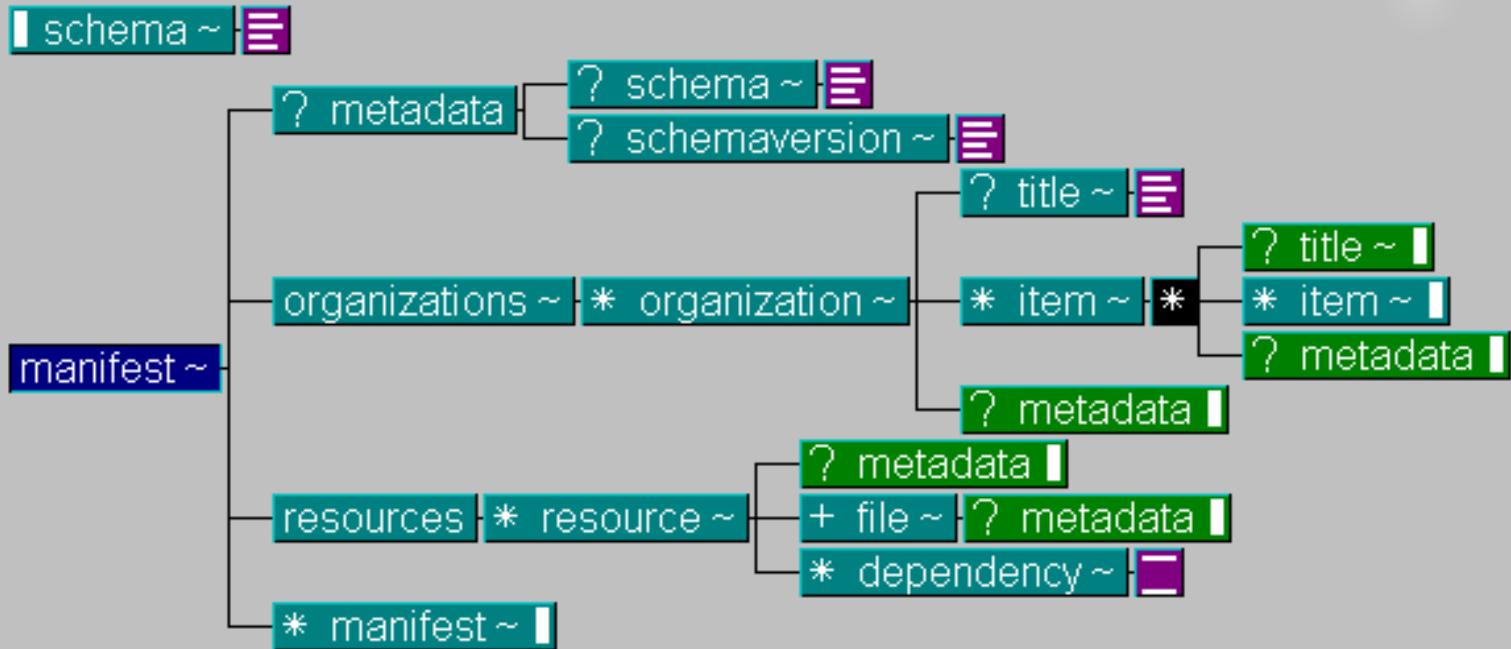
Expressivity of contents

- Need of semantics associated to specifications
- Grouping of elements in semantic layers
- Meaningful elements for rest of layers
- Different specifications in different levels
- Classification of specifications depending on the covered levels

Educational Content



Content Packaging: XML



IMS Content Package (Ex.)

TOC 1

Lesson 1

Introduction

Content

Summary

[lesson1.html](#)

[intro1.html](#)

[content1.htm](#)

[summary1.htm](#)

Lesson 2

Introduction

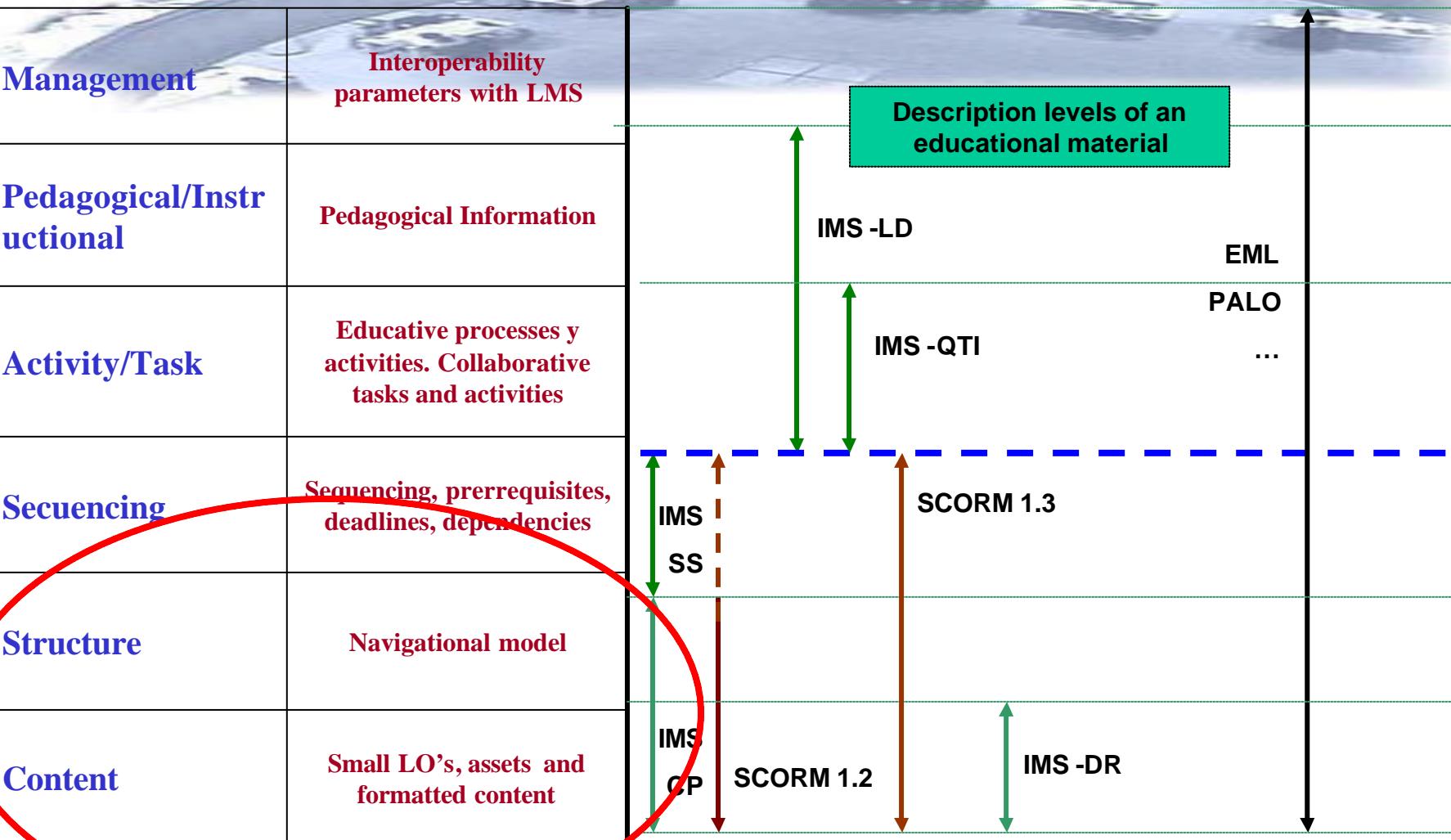
Content

Summary

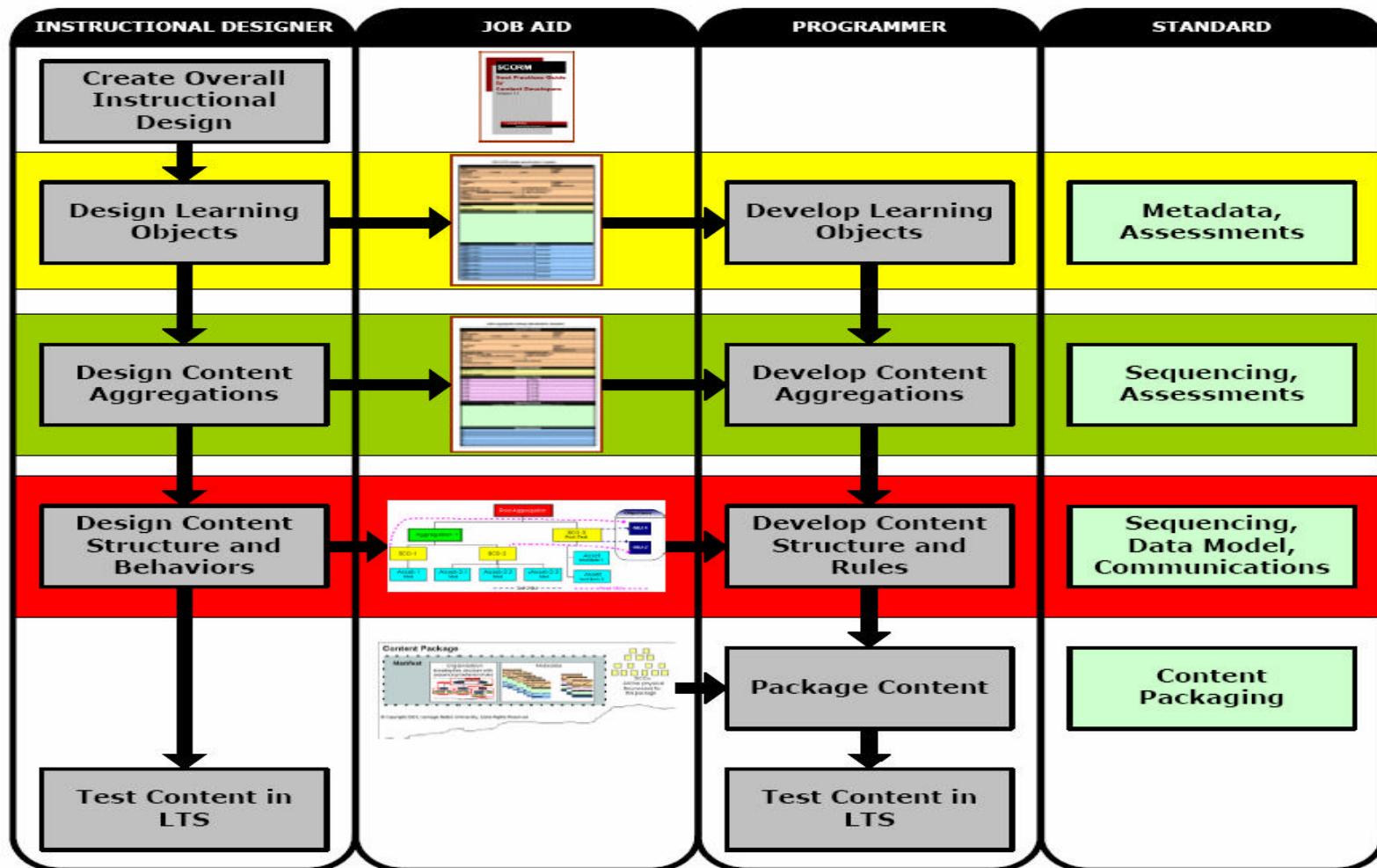
...

[IMS Manifest \(XML\)](#)

Educational Content



Current Authoring model using LO's



Celebrate Demo Portal

- Celebrate created a Demo Portal to illustrate Search, retrieval and use of LO's
- More than 1.500 LO's currently available
- Mainly focused on schools, not for higher education
- Currently launching LIFE initiative to continue Celebrate (European School net, EUN)
- <http://life.eun.org>

Celebrate Demo Portal

Celebrate - Microsoft Internet Explorer

Archivo Edición Ver Favoritos Herramientas Ayuda

Atrás Último Buscar en la Web PageRank 63 bloqueado(s) Opciones

Dirección http://demoportal.eun.org/celebrate_dp/index.cfm Ir Vínculos

Google

search

CELEBRATE: Learning Objects for Schools

Home sv | en | fr | fi | no | it | hu | he

Welcome Victor Adamson My Profile

search for Learning Objects

Advanced Search for Learning Objects and Assets

use Your Basket Go to your learning resources

Go to your Authoring Area Create new lessons

Go to the Virtual Classroom Manage your courses

create / contribute Add a Learning Resource Upload your own items to the portal

Edit Metadata Edit the metadata of your learning resources

feedback Evaluate a Learning Object Evaluate Learning Objects you use

Evaluate the portal

Using Learning Object Tell us how you use them in your classroom

browse by subject

- Art(82)
- Biology(144)
- Physics(289)
- Mathematics(198)
- Religion(8)
- Cross-curricular education (35)
- Environmental education (93)
- History(31)
- Music(20)
- Informatics/ICT(11)
- Chemistry(61)
- Geography(46)
- Language and literature (140)
- Natural sciences(577)
- Philosophy(1)

Overview

General Overview

CELEBRATE is a large-scale demonstration project co-ordinated by European Schoolnet and supported by the European Commission's Information Society Technologies Programme (IST). Its aim is to examine how new, more flexible forms of digital content called Learning Objects (LOs) can enhance teaching and learning in schools across Europe... [More](#)

News

New Learning Objects

 Take a look at the skool Learning Objects in Science and Maths developed by Intel in association with key partners

New Release

The Demo Portal 2.0 has been released.. [More](#)

Advice

If you do not know where to start, take a look at the scenarios!

- Project FAQ
- Learning Objects: an introduction
- Glossary: explanation of terms
- What you need to run Learning Objects
- CELEBRATE metadata
- Pedagogic Library
- Useful Links

Community

- Om du är lärares eller elev i en finländsk pilotskola, [klicka här](#).
- Jos olet suomalaisesta pilottipilaitoksesta, [klikka tästä](#).
- Si vous êtes un enseignant de France, merci de [cliquer ici](#)
- Ha magyarországi tanár vagy, please [kattints ide](#)
- Hvis du er lærer fra Norge, venligst [klikk her](#)
- If you are a teacher from the UK [click here](#)
- If you are a teacher from Israel [click here](#)

Inicio

25 Internet ...

Extensions

CBUC -- BARC...

2 Microsoft ...

2 Netscape

Adobe Reader...

3 Microsoft ...

XML Spy - [Un...]

2:02

TAEE -- Valencia,
Julio 2004

Universidad Nacional de Educación a Distancia

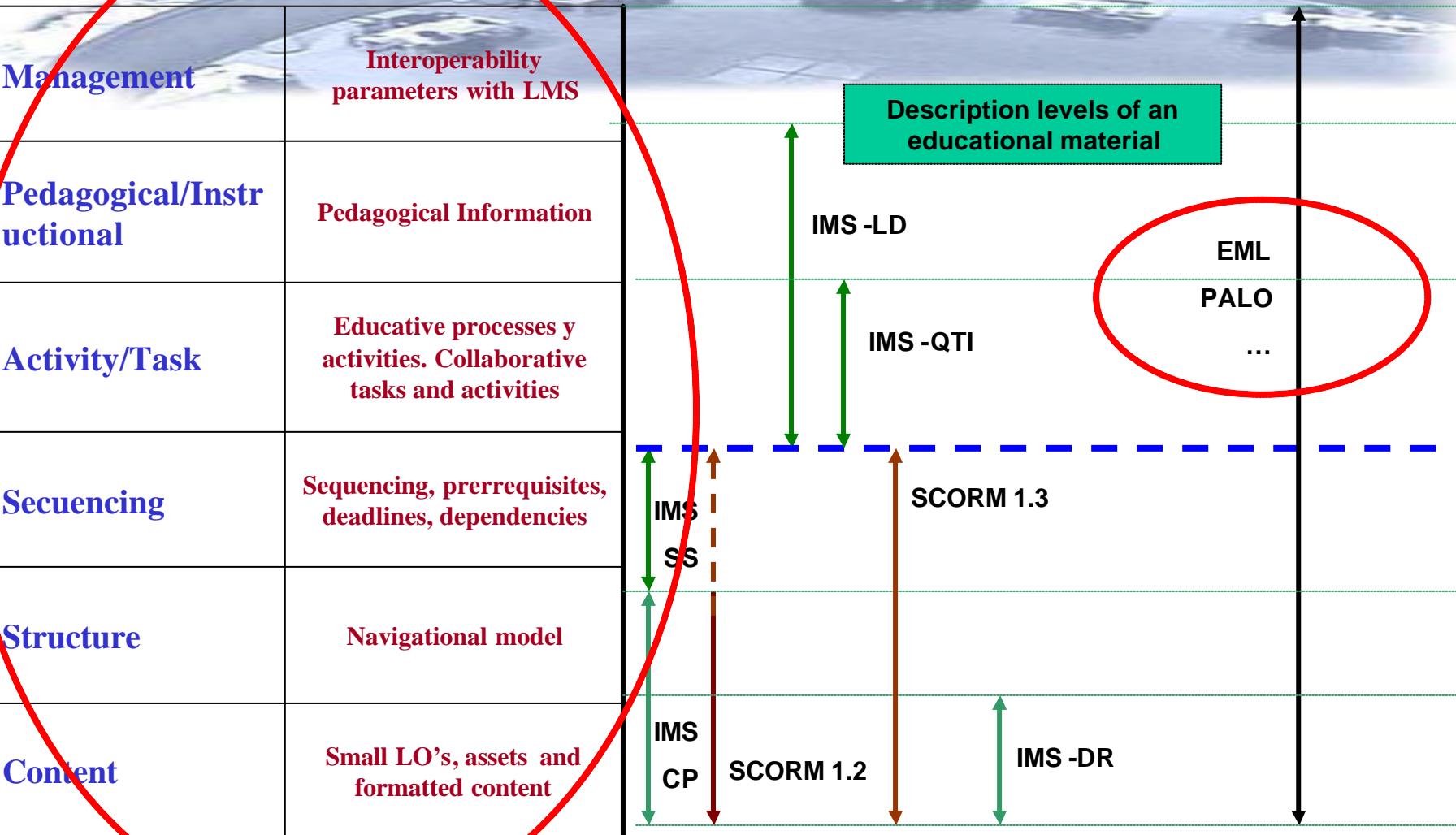
LO Examples

- Components of inner ear
- Process of distillation
- Change of State – Water

Concept of educational modeling language

- Content representation in a variety of levels
- Description of learning tasks: Modelization of activities and instructional processes
- Compatible with LO model
 - Stored in repositories as another LO's
 - Use of ontology and conceptual maps to retrieve “low granularity” LO's

Educational Content



Evolution of Educational Modeling Languages

CEN/ISSS Meeting in Torino (Oct 2001)

→ Introduction of:

- EML (UONL)
- PALO (UNED)
- Targeteam (German Mil. Forces Lab)
- Others

See “Europe Focuses on EML” S. Wilson (CETIS) in
<http://www.cetis.ac.uk/content/20011015103421>

→ Survey of Educational Modeling Languages

→ Development of **IMS-LD** based on EML (OU of the Nederlands)

EML: simple yet powerful

- People engage in Activities, for which they use Resources
 - People: one or many, learner or staff roles
 - Activities: description, structured
 - Resources: learning objects & services (chat, etc.)
- Many roles, activities and resources need co-ordination in a workflow: learning flow
- An instructional design/pedagogy/learning design essentially is a learning flow.

method

play



Role-part 1
Role-part 2
Role-part 4
Role-part 5

Role

Activity

Activity-
Description

Environment

Learning objects
Learning services

components

Example: Course creation in EML

1. **Roles:** Definition of roles (ex. Student, staff member) and definition of the workspaces of each one of the roles, and also types of outcome
2. **Activities:** Definition of content by mean of one or more activities
3. **Methods:** Definition of sequences of activities defining
 - **Activity structure**
 - **Play per role**
 - **Conditions**
 - **Components:** tools

[XML File](#) (Example)

Activity structure

AS-boeing-simplified

- AS-introduction
 - LA-fuel-valve-lesson-intro
 - LA-fuel-valve-theory
- AS-lessons-and-procedure + E-interactive-electronic-training-manual
 - AS-fuel-valve-lessons
 - LA-lesson-hazards OR
 - LA-lesson-components
 - AS-fuel-valve-removal-procedure
- AS-tests + E-interactive-electronic-training-manual
 - LA-knowledge-test-hazards
 - LA-knowledge-test-components
 - LA-performance-test

Authoring process and use

- Requires a RTE to play the course (Edubox, Coppercore, etc.)
- Manage activities independently from LO's and other static resources
- Manage static resources independently from activities defined in the course
- **Reuse ALL: Resources, Activities, Course templates → !!This is it!!**

More approaches to LO creation

- PALO Educational Modeling Language
 - Developed at UNED University
 - Presented in CEN/ISSS EML Workshop in Torino (2001)

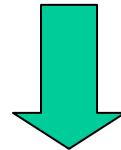
Features

- Uses of **domain ontologies** rather than metadata labeled LO's
- Simple tasks (no roles) and sequencing

Cognitive Design Process

Conceptualisation Phase

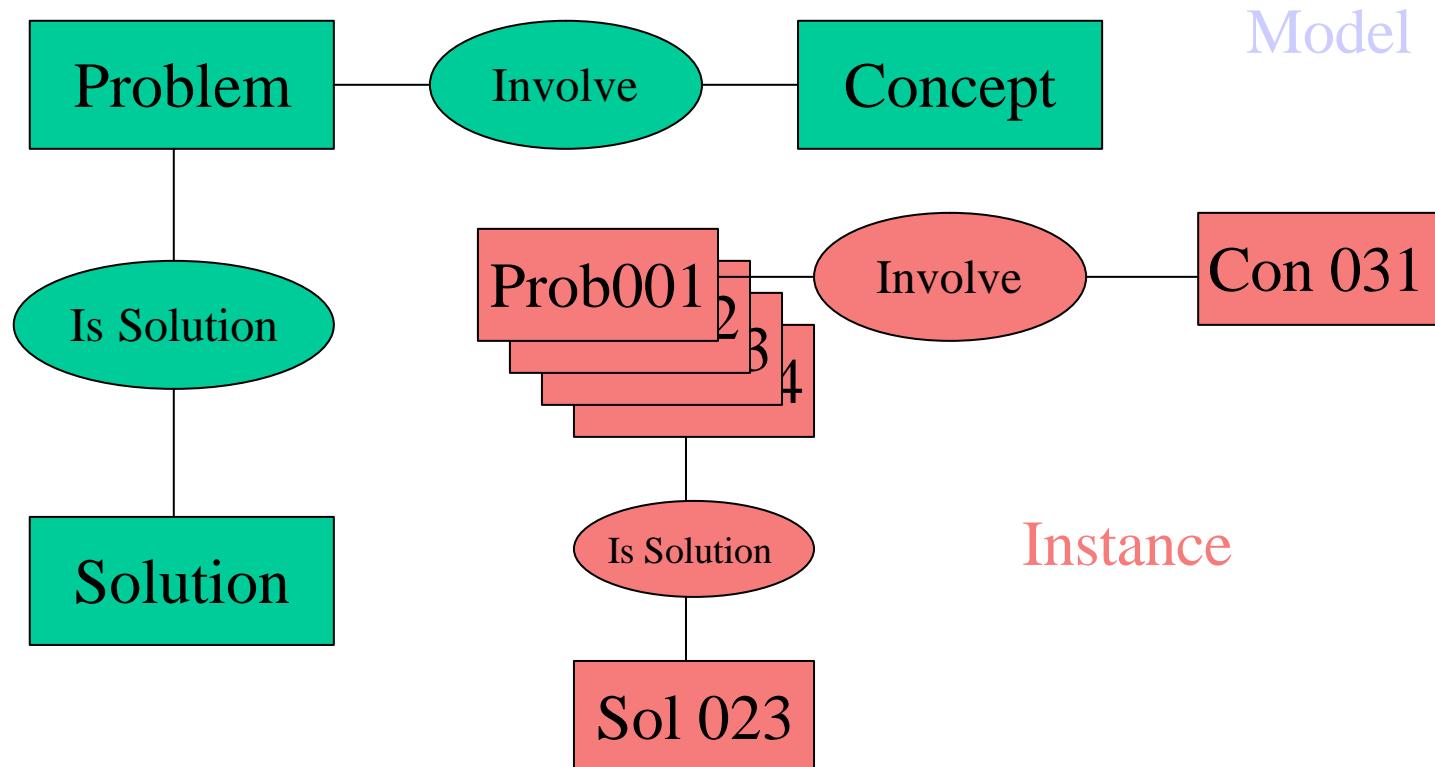
Creation of a **generic domain** to describe content matter =
ONTOLOGY



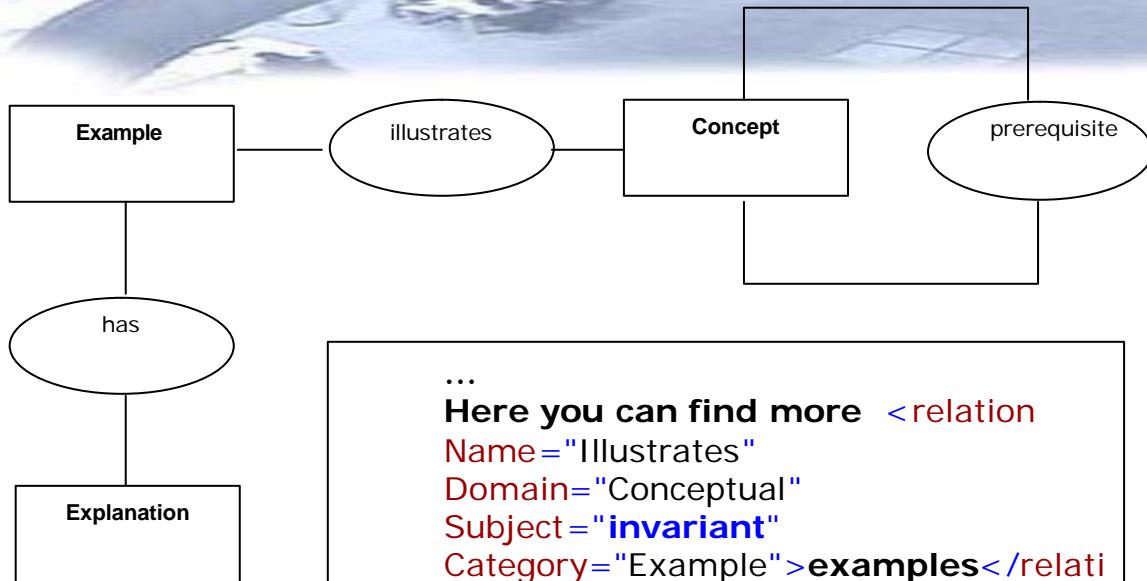
Instantiation Phase

Creation of one or more **instances** for a particular domain
matter

An example: Models and Meta-Models

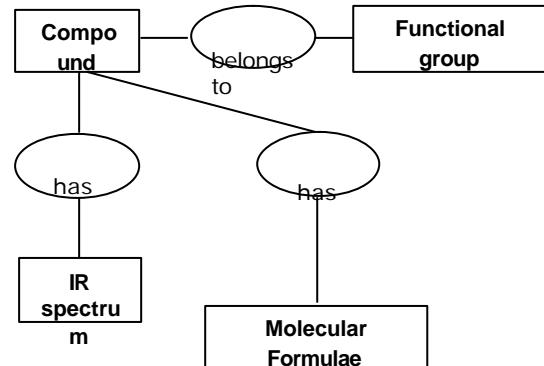


Use of ontologies of LO's



XML Example

...
Here you can find more <relation
Name="Illustrates"
Domain="Conceptual"
Subject="**invariant**"
Category="Example">examples</relation>
of the concept invariant.
...



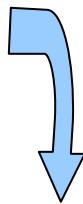
Learning Scenario
(EXAMPLE)

PALO production cycle

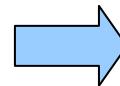
ALO Template (DTD)



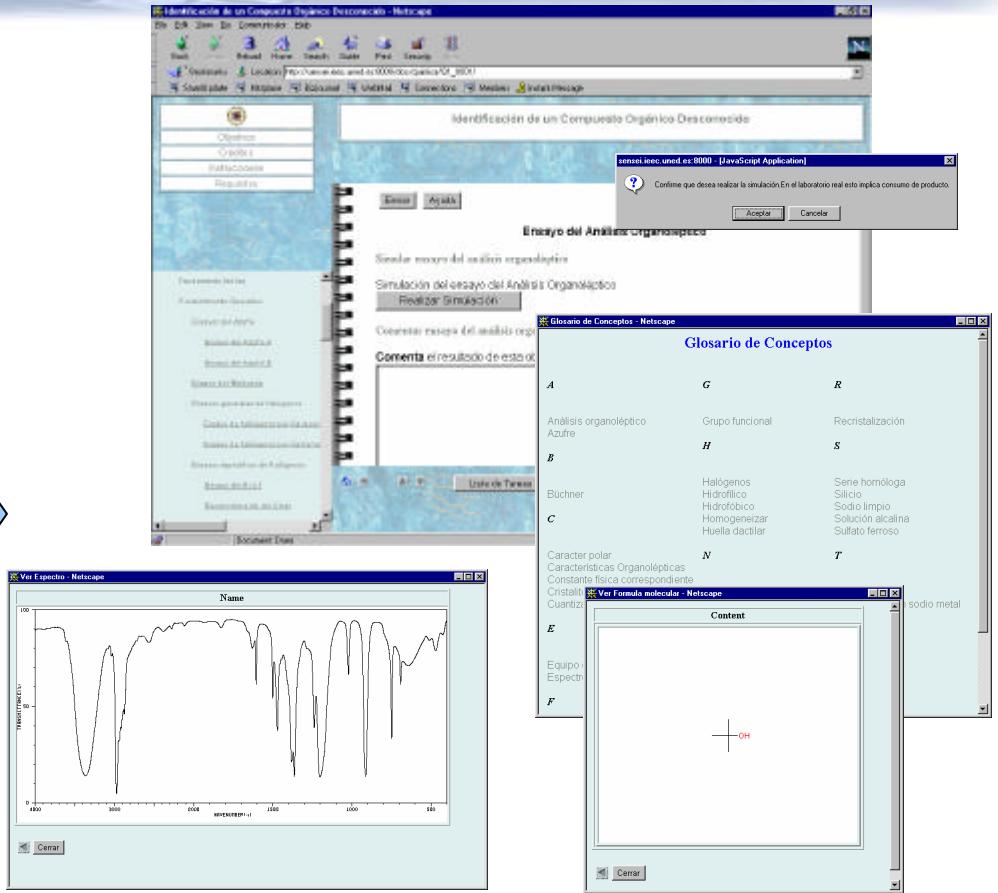
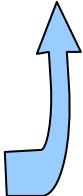
PALO File (XML)



PARSER



Domain
Knowledge
Base



Editing Process

ce: cea-nicli.palo

dit Mule Apps Options Buffers Tools HTML Modify Move Markup View DTD Help

Dired Save Print Cut Copy Paste Undo Spell Replace Info Compile Debug News

#####
MÓDULO 2
#####

modulo nombre="riclim2" traza="si" etiqueta="Módulo 2" fecha="1-04-2000">

>

ta es la tercera entrega del Curso de Introducción a la Creación de cursos Internet y Web con Linux que corresponde al Módulo 2. En este módulo nos introduciremos en el concepto de lenguaje Insertado en HTML para conoceremos la sintaxis que utilizan algunos de estos lenguajes, en particular SSI y LITE.

Más aprenderemos a instalar y configurar una base de datos MySQL en nuestro sistema para poder diseñar aplicaciones Web capaces de comunicarse con nuestra base de datos mediante LITE.

R>

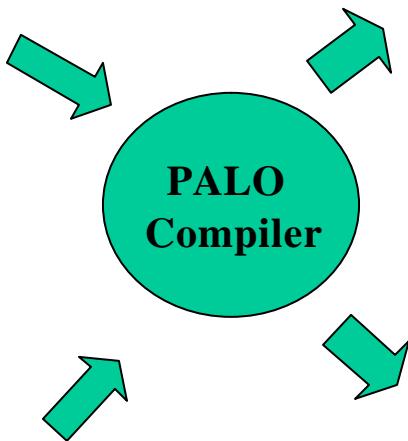
lo que se refiere al lenguaje de programación JavaScript, hemos decidido pasarlo al siguiente módulo por motivos didácticos y de finalización del curso.

ema nombre="Programación SSI"

La forma más sencilla de implementar páginas con contenidos dinámicos es incluir instrucciones SSI (Server Side Includes) entre el código HTML. Cuando el servidor recibe una petición a una página con código SSI genera una respuesta al cliente en la que sustituye el código SSI.

-->XEmacs: cea-nicli.palo (HTML3 [cea] PenDel Form)---31%--

PALO
Document



Práctica de Programación II Curso 1998-1999 - Netscape

File Edit View Drk Communicator Help

Back Reload Home Search Stop Print Security Shop

Bookmarks Locations http://www.etc.edu/practicas/index.htm

Datos en CDROM Test de Miguel Asistente Mensaje Interfaz Búscar Novedades etc...

Práctica de Programación II Curso 1998-1999

(3.1) Cuestiones sobre Especificación Consideraciones sobre (4.2) Cuestiones sobre (4.3) Especificación Especificación que p (4.5) Especificación - Diseño recursivo Especificación de la (5.2) Cálculo de la n Análisis por casos (5.4) Análisis por ca

Almacenar Deshacer Ayuda

Escribir la respuesta

Llamada de Respuestas - Netscape

Cerrar

Lista de Respuestas

Respuesta_3.2	Almacenada
Respuesta_4.2	Por enviar
Respuesta_4.3	Por enviar
Respuesta_4.5	Por enviar
Respuesta_5.2	Por enviar
Respuesta_5.4	Por enviar
Respuesta_5.5	Por enviar

Tutor Scenario

Documentos de Consultas de "practicas" - Netscape

File Edit View Drk Communicator Help

Back Reload Home Search Stop Print Security Shop

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Datos en CDROM Test de Miguel Asistente Mensaje Interfaz Búscar Novedades etc...

Práctica de Programación II Curso 1999-2000

Elige grupo: CEURA

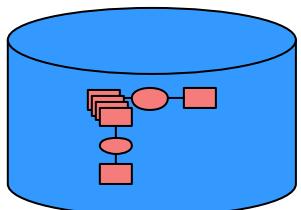
Tarea 4.2

Descripción: Si en la postcondición de una función no se hace referencia alguna a las variables de entrada, ¿qué puede ocurrir de dicha función?

Respuesta: Esta situación nos indica que no depende de ningún parámetro de entrada, por lo que su postcondición es constante.

Anotaciones: La postcondición es constante cuando no depende de las variables de inserción.

Domain
Model



Thanks!

Structure of LO's Modeling for eLearning

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