ICOPER objectives

Outcome-based learning

- Analyse and facilitate the adoption of standards and specifications
- Make learning resources accessible
- Validate standards and specifications and condense them into the ICOPER Reference Model (IRM).
Open ICOPER Content Space

- umbrella combining a set of specialized interconnected repositories, content and tools, as a test bed for the specifications and standards that become part of the ICOPER Reference Model (IRM).

Key processes in outcome-based education

- Learning outcomes
- Teaching methods & Learning designs
- Learning content
- Learning opportunities
- Assessment
OICS architecture

<table>
<thead>
<tr>
<th>Repositories</th>
<th>Metadata</th>
<th>OICS Middle Layer</th>
<th>User Interfaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>OpenLearn</td>
<td>Learning Designs</td>
<td>SQI interface (Lucene/SOLR)</td>
<td>LMS</td>
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<tr>
<td>Ariadne</td>
<td>Learning Methods</td>
<td>SPI interface</td>
<td>e.g. Moodle</td>
</tr>
<tr>
<td>OAI-PMH</td>
<td>Learner assessments</td>
<td>User management service</td>
<td>Desktop Tools</td>
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<td>GLOBE</td>
<td>Learning Outcome Definitions</td>
<td>Recommendation</td>
<td>AJAX</td>
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<td>EduaNext</td>
<td>Learning resources</td>
<td>Search and retrieval service</td>
<td>REST</td>
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<td>etc.</td>
<td>Learning Outcome Profiles</td>
<td>Publication services</td>
<td>e.g. Powerpoint</td>
</tr>
<tr>
<td></td>
<td>Learning opportunities</td>
<td>SPI</td>
<td>Widgets</td>
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</tbody>
</table>

OICS Middle Layer

- Search and retrieval
- Publication
- Learning outcome profile
- Recommendation
Data models I: ICOPER LOM AP

Learning Design Resource
- title: string
- authors: string[*]
- licensingModel: string
- summary: string
- rationale: string
- subject: string[*]
- learningOutcomes: string[*]
- groupSize: string
- duration: string
- learnerCharacteristics: string
- setting: EducationalSetting
- graphicalRepresentation: Picture
- sequenceOfActivities: string
- roles: string[*]
- resources: string
- literatureReferences: string[*]
- has variation

Comment
- type: CommentType
- content: string

EducationalSetting
- face-to-face
- online
- distant
- blended

Data models II: Learning outcome definitions

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<thead>
<tr>
<th>Name</th>
<th>Data type</th>
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<tbody>
<tr>
<td>Identifier</td>
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<tr>
<td>Title</td>
<td>LangString</td>
</tr>
<tr>
<td>Description</td>
<td>LangString</td>
</tr>
<tr>
<td>Type</td>
<td>Vocab (knowledge, skill, competence)</td>
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</table>
ICOPER scenario I

• Linking Learning Outcomes, Teaching Methods, Learning Opportunities and Learning Designs
ICOPER scenario II
Storing learning outcome definitions

ICOPER scenario III
Editing Teaching Methods and Learning Design: OpenGLM
ICOPER scenario IV
OICS Roundtrip Authoring Re-use

ICOPER scenario V
Managing learning opportunities
ICOPER scenario VI
Learner assessment

1. Outcome-based search of assessment resources
2. Sharing annotations about assessment resources.

ICOPER scenario VII
Tools publishing achievements

- UC3M .LRN
- Umeå University, Moodle block
- IMC, Clix
- eXact enterprise LCMS.
- AGH, display of PALO profiles in Facebook
- Tallinn University, Elgg