February 4, 2009, Luxembourg
1st Negotiation Meeting
Towards the development of a Shared Digital Repository for Formal and Informal Science Education
The discussion of developing libraries that use IEEE LOM as their main metadata standard revolves almost exclusively around developing learning objects from scratch—a practice that is too time consuming, expensive, and unsustainable as a design practice with the preservation and public dissemination of science centres and museums extended educational resources. Further, developing additional vocabularies for assets that don't fit a standard requires skills that are both complex and time consuming to master. The experience from the development of the Exploratorium Digital Library shows that LOM fell short in allowing the development team to accurately and reliably describe informal science learning assets, and thus, the development of new vocabularies for existing fields and extending the range of LOM fields was considered necessary (Fait and Hsi 2005).
Teachers frequently do not have the skills to develop activities based on a range of educational models. This results in a gap between application of pedagogy and the effective use of tools and resources.

Any inability to engage with educational taxonomies through unfamiliarity with the relevant metadata and vocabularies makes it very difficult for teachers to search for generic learning activities from various subject disciplines.

e-learning practice is moving towards the reuse of generative resources (e.g. resources developed during learning tasks). This means that the outputs from learning activities should also be considered for reuse. However, most teachers do not have the required e-literacy skills (for example to archive activities) to allow for effective reuse of learning resources and activities.

Any focus on the development of 'definitive resources' can lead to the production of inflexible materials that do not cater for individual learning contexts. There is a need for tools that allow the teacher to customise generic components to provide a tailored learning experience.

Although efforts for collecting teaching & learning resources in learning repositories have long been deployed school teachers have yet to prove their competence in taking advantage of their full potential.
Constrains in the use of the existing digital content in science centers and museums

- The available content is widely spread among different repositories. Most importantly, these repositories are not organized according to a standardized ontology and therefore they are not inter-operable.
- Learning objects and use of IEEE LOM tends to rely on the assumption that learning objects are only developed from scratch and does not include discussion on how to retrofit existing learning resources to fit a learning object format.
- Existing metadata ontologies suffer from two fundamental issues: a) tagging an extensive collection is very expensive and time consuming and b) even when the collection is tagged, the metadata included are static and not context/user sensitive.
- The existing portals and repositories do not make adequate use of the latest presentation technologies to make the content attractive.
- Content is not consistently multi-lingual and whichever translations exist, they are not based on a unified translation key.
- Intellectual Property Rights (IPR) issues are not addressed in a systematic way and are therefore inducing significant operational risk on content providers.
- There is no sustainable business model in place that can assure a financially viable exploitation of the available digital resources.
Social Tagging

Social Tagging and its resulting Folksonomy (the assemblage of concepts expressed by the users) offer ways to understand what users of science digital content consider important. The advantages of the approach are:

- A huge amount of content can be annotated without any cost to the provider.
- The tags added are context sensitive. For instance, through statistical models one can provide a user with the tagging information most relevant to users with profiles similar to his own. Thus, the metadata information is not static or context free but incorporates essential information about the users, their needs and their personal or group semantics.

Social Tagging appeals to museums and science centres because it embodies a rather similar philosophy: tagging represents a dialog between the viewer and the exhibit, and the viewer and the museum.

Tagging lets users assert their own connections and associations between objects and phenomena in ways that reflect personal perspectives and interests. Tagging further enables re-discovery of activities previously performed; users’ tags record salient characteristics of personal interest and support subsequent searches.
Steps Forward

Folksonomies constructed in social tagging environments are direct evidence of what people see as significant. Looking at the types of tags supplied by those outside museums and studying how they correlate (or do not) with data now made available by museums can provide insight into users’ perceptions and help museums and science centres adapt to meet their missions and the current challenges.
Steve is a collaboration of museum professionals and others who believe that social tagging may provide profound new ways to describe and access museum collections and encourage visitor engagement with museum objects. The activities include researching social tagging and museum collections; developing open source software tools for tagging collections and managing tags.
The Steve team has released a Facebook application (http://apps.facebook.com/steve-museum/) that allows Facebook users to tag art, share images with friends, see the descriptions contributed by their friends, and display works of art from the Steve tagger application on their Facebook pages.
Metadata created by an indexer related to the learning resource type may not always reflect how a resource will really be used in classrooms by experienced teachers. For example, an indexer might decide to add metadata which indicates that something is essentially a “drill and practice” type of resource whereas, in practice, teachers might actually be able to use that resource in many different pedagogical contexts – even for collaborative learning. MELT, therefore, begins with the assumption that we also need metadata that more accurately reflects how learning resources are actually used in different learning contexts. And that teachers themselves should be given an opportunity and tools so that they can add their own metadata to resources they have used.
Social tagging also has some serious shortcomings

- The semantics of the tags rest with the user, holding absolutely no semantic value for the system and are not connected to each other through any ontology. Therefore, they can not be used to extract correlations or any other kind of high level aggregation rules.
- The whole system is sensitive to meta-noise, meaning that misspelled, inappropriate or irrelevant metadata can be inserted, effectively reducing the quality and relevance of the tagging.
- Tags that do not follow a structured ontology go against the model of Semantic Web since they offer small opportunity for automatic classification, summarization and manipulation of content.
The project investigates on the benefits of enriching digitised scientific digital objects which are currently dispersed in European science museums and science centres, with well-defined semantic metadata along with social tags, so that they become more widely and coherently available, and better searchable and usable in a variety of learning occasions.
The OpenScienceResources users will be involved in a series of scenarios that will demonstrate to them how they can use and re-use high quality digital content of science centers and museums available on the web (first level). Additionally, the proposed approach aims to raise awareness of users on the need for accurate tagging of resources and to provide a user-friendly approach that motivates them to quickly and easily add metadata to resources that they have both used and created (second level) and to combine the advantages of traditional metadata with state-of-the-art folksonomy approaches to provide unprecedented versatility (third level).
The scale is up to 1kg!
To implement the OSR vision, the consortium brings together a balanced mix of high quality science museums and science centers, pedagogues, educational technologists, metadata experts, user groups and standardization bodies.

The envisaged approach consists of the following steps:

a) study the state-of-the-art in metadata ontological approaches coupling them with modern social tagging and folksonomies,

b) design a set of “proof-of-concept” experiments to try out the different theoretical approaches that will be developed and implement them in the OSR Portal,

c) extensively validate the proposed approaches in real-life usage contexts employing the user groups represented in the consortium,

d) document the whole process, disseminate the results, cluster with similar initiatives and stakeholders and, through the significant networking capacity of the OSR consortium, work towards a pan-European digital educational content standard.
Objectives

- To review the state-of-the-art on digital science education repositories and relevant metadata structures used. A detailed and systematic methodology will be developed to evaluate existing solutions in digital science education content organization and delivery in science museums and science centers. The outcome of this work will be the identification of a series of cases that demonstrate ways of effective and long term collaboration between the science centres, the schools and the visitor communities in general.
Objectives

• To propose a new organization scheme for digital science education content that is available on science centers’ and museums’ websites and introduce an enhanced paradigm of access, usage and incorporation within the formal and informal education contexts. The consortium will explore the ways that will enhance access to science museum and science centres digital educational content through the development of a series of Educational Pathway Patterns for each of the project’s user groups (students, teachers, families, visitors in general). Within the project’s user-centred activities, the partnership will explore user-contributed terminology, collected on the Web, as a way to address the identified inconsistencies and gaps between the vocabularies of the museums professionals and the user communities. The extent will be investigated to which user-created descriptions can provide science centers with missing subject-based information for their content and exhibits and make the available on-line resources more useful. In this way the partnership will encourage user engagement with the museums and science centers content. Museums and science centres offer a unique social context within which the consortium will test and evaluate tagging and folksonomy methodologies.
Objectives

• To customize existing cutting-edge technology to a shared environment that enables the collection of user terminology and facilitates its analysis. During the implementation phase the consortium will provide the user communities with the necessary search and tagging tools and to encourage them to use it to access the digital content of the participating museums and science centers. The big challenge here is to make the process as unobtrusive and intuitive as possible, in order to enhance the user experience. A common access point to the different tools, the OSR Portal will be developed to support the user communities during the extended trials. The user-interfaces will be multi-lingual by design and will support both visit access mode and web access mode. The proposed approach will create fascinating opportunities to interact with the science digital objects in totally innovative ways. To capitalize on that, OSR will put in place enhanced presentation modes using existing state-of-the-art tools. This will add the necessary “edutainment” quality to the portal, maximizing visibility and allowing for a financially sustainable operation beyond the end of the project.
Objectives

- **To perform an extended validation in a wide network of Science museums and centers across Europe.** The OSR consortium will design a series of Proof of Concept experiments that deploy the shared tagging tools and build a common data set to support collective analysis of social tagging and folksonomy in the participating science museums and centers, in the framework of a series of **scenarios of use** (based on the different Educational Pathway Patterns) that will be developed for this purpose. The goal of the implementation of these scenarios is to evaluate the effectiveness of the introduction of the term-collection tools, exploring a series of research issues that OSR partners have articulated as a group, and to build a community of practice that leverages project’s partners’ individual experiences and expertise, to which a broad range of participants can contribute. The content will be provided by the top science museums and science centres, contributing numerous high quality digital objects (images of exhibits, videos, animations of physical phenomena, educational projects and relevant activities, curriculum based lesson plans etc).
Objectives

• **To propose a Roadmap towards a standardized Science Resources (re-)usability approach.** The OSR approach asks for knowledge areas integration, effective and boosts cross-institutional collaboration and organisational change in the field of both formal and informal science education. This effort will be documented analytically and systematically in “The Roadmap towards a standardized Science Resources (re-)usability approach”. A structured set of recommendations to support the deployment of science educational content services offering enhanced access and reusability will be developed. The Roadmap will include a series of guidelines for the design of Science Education Learning Content and Activities, on the appropriate metadata methods needed for their description in respect to both their educational and their domain-related characteristics. The Roadmap will also offer the guidelines concerning how these templates will be combined and finally it will recommend appropriate processes and benchmarking criteria for quality certification of the science education content.
Objectives

• To disseminate the project’s work effectively through networking with relevant projects, networks and initiatives, the participation in several EC clustering activities and the work towards a pan-European digital science content standardization. The OSR consortium includes strong representatives from all key stakeholders in formal and informal science education: content providers, educational technology providers, users and educational policy makers. This will assure the exploitation of the project’s work beyond the consortium and Open Science Resources contribution to the uptake of science education specifications and standards in the EU27 and beyond. The project includes organizations that are actively involved in specification and international standardization committees (e.g. ISO/IEC JTC1 SC 36 Information Technology for Learning, Education and Training (Working Group 3: Metadata for Learning Resources) that ensures that the project’s research results will be communicated to the respective Technical Committees.
Expected Results

- a) Methodology for designing, expressing and representing education pathways (real or virtual) in science centers and museums that attempt to blend informal and formal science learning. The tagging data that will be collected will be structured to enable comparative studies about the meaning-making process around science exhibits, natural phenomena and laws, highlighting the difference between expert and non-expert vocabularies. This metadata tagging approach will be context sensitive and will allow tagging by the end-user. It will combine the advantages of traditional metadata ontologies with state-of-the-art folksonomy approaches to provide unprecedented versatility. More precisely, the proposed approach foresees the effective synthesis of the following types of metadata:
  - Educational metadata – are related to the educational and pedagogical characteristics of the learning object, as well as, the domain and the context of the learning object, the technical properties and the IPR issues.
  - Social and usage related metadata – are aimed at describing what users actually do with the learning objects. They include explicit user feedback captured through folksonomies and social tagging.
A simplified rendering of a possible data model to be used for the OSR approach. The data model is significantly more complex that the simple relationship between user, tag, and data. This complexity – reflecting the social context of tagging – distinguishes the proposed approach from a number of tagging projects already in place.
OSR in Action

- Task analysis of the different phases of a possible OpenScienceResources extended field trip which includes preparatory, pre-visit, visit and post-visits activities for teachers, students and the museum staff and presents an innovative way for bridging the gap between formal and informal learning settings. Such museum-school collaborations when designed well, provide a new model for “field trips beyond field trips”. As increasing numbers of museums and science centers embrace new media to update their offerings and create new bridges to free-choice learners, as well as formal learners in schools, technology offers a means to overcome some of the organizational and pedagogical barriers that currently plague effective school-museum collaborations and partnerships.
student in classroom

- play with exhibit
- modifying exhibit parameters
- viewing parameter and visualisation changes
- compare experience to predictions
- storing parameter dump
- changing exhibits
- produce video

student

- communicate via internet

student in museum

- work on (individual or group) task
- communicate
- examining exhibits
Example: The Atom
StoryLine connected with the Otto Hahn’s discovery of nuclear fusion
Expected Results

- **The OSR portal.** It will be a sustainable service, providing access to high quality digital content offered by the members of the consortium. It will act as the main “hub” of resources available in the developed network of science museums and science centers that will serve as distributor of information and organizer of suitable educational (formal or informal) activities. The system will incorporate tools that facilitate the analysis of submitted terms and their integration into science museum and centre systems and the OSR shared system. The portal will have two access modes: **web mode** and **visitor mode.** In web mode, the virtual visitor will have access to the digital content through the web, being able to instantly find, retrieve and correlate digital science education material from distinct sources. Visitor mode is reserved for in-site access (through info-kiosks, PDAs, or other available visualization applications that are used to enrich the visitor’s experience) within the science museums and centers and allows access to supplementary information related to the exhibits being physically visited.
Expected Results

• **The OSR Community of practice.** The OSR approach is based on the creation of virtual communities of learners, students, teachers, museum educators and researchers who will be involved in the offered activities through the OSR Portal. The Portal and the relevant tools will be available to, and invite use by, different communities and target groups, as diverse as learners and teachers of science, researchers and scientists and the general public. Using tags will allow for users to create their own "folksonomies" for their own purposes (sharing, reusing, indexing, etc), and also creates use-generated criteria for what people think is important about an object over time. This is useful for community building purposes, adding valuable metadata for future users, and also, from a research perspective, allowing us to see how the use of tags versus a top-down taxonomy are aligned with each other (and how useful this is to the search and discovery of resources. The communities that develop around shared knowledge could be powerful resources for museums and science centres.
Expected Results

• **A Roadmap towards a standardized Science Resources (re-)usability approach.** The work of project will be documented analytically and systematically in “The Roadmap towards a standardized Science Resources (re-)usability approach”. The project will generate a structured set of recommendations constituting a pan European roadmap for Science learning services (formal and in-formal), aiming at sustainable development of content and enhanced accessibility and usability. The project will disseminate its outputs, through a project-long dialogue, concentrating experts and stakeholders through conferences, thematic meetings and consultations. Given its broad geographical coverage and the importance of the participating institutions, the consortium will use its full networking capacity to negotiate, discuss, explore and finally propose a standardization process for the organization of science education digital objects of science centers and museums.
The OSR consortium aims to organise and enrich with metadata a rich collection of existing educational resources. The collection includes 300,000 web-based materials, guidelines for the realization of both physical and virtual educational field trips (connected to the school curriculum or more open), lesson plans and relevant educational materials, professional development and training materials, educational projects and activities for schools, families and individuals, digital images of exhibits, videos and animations of physical phenomena and instructional descriptions and thousands of electronic publications on topics ranging from everyday science topics to issues concerning scientific research.
Protection of Knowledge

- Consortium Agreement and Memorandum of Understanding
- All pre-existing know-how needed by the consortium will be clearly specified in the Consortium Agreement
- IPR-related metadata will be included in the metadata methodology
Multilingual and/or multicultural aspects

- Metadata tags will be multi-lingual
- Multi-lingual portal
- Multi-lingual content and educational scenarios
- Multi-cultural metadata
- Validating the multi-cultural educational value of the proposed approach
Development of a Science Education Vocabulary

Astronomy
- Atoms & molecules
- Changing materials
- Chemical reactions
- Earth science
- Electricity & magnetism
- Elements, compounds & mixtures
- Energy
- Energy & nutrient transfer
- Environment
- Forces & motion
- Green plants
- Humans & other animals
- Life processes
- Light
- Obtaining & using materials
- Radioactivity
- Scientific enquiry
- Solids, liquids & gases
- Sound
- Tools for Science
- Useful materials & products
- Variation, inheritance & evolution
- Waves

Training

Galaxies: halos
- Galaxies: irregular galaxy
- Galaxies: rotation curve
- Galaxies: spiral galaxy
- Galaxy clusters
- Gamma ray bursts
- Globular clusters
- Gravitational lenses
- Gravitational lenses: Einstein ring
- Gravitational lenses: microlensing effect
- Hertzsprung-Russell diagram
- Hill region
- Hubble expansion
- Inflation
- Intergalactic medium
- Interstellar medium
- Interstellar medium: dust
- Interstellar medium: gas
- Jets
- Kupper belt objects
- Light curve
- Main sequence
- Meteor
- Meteorite
- Milky Way
- Moon
- Nebula
- Neutron stars
- Neutron stars: pulsars
- Nucleosynthesis
## Success Indicators

<table>
<thead>
<tr>
<th>Objective - expected result</th>
<th>Indicators</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggregate and make interoperable a critical mass of content</td>
<td>Content (Educational Pathways/Scenarios)</td>
<td>15</td>
<td>50</td>
<td>100</td>
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<tr>
<td></td>
<td>Content (learning objects) aggregated (educational metadata)</td>
<td>200</td>
<td>500</td>
<td>1000</td>
</tr>
<tr>
<td></td>
<td>Content (learning objects) aggregated (social tags)</td>
<td>500</td>
<td>5000</td>
<td>50000</td>
</tr>
<tr>
<td>Increase in use of underlying content</td>
<td>Organization of Training Workshops (Summer Schools)</td>
<td>7 (1)</td>
<td>7 (1)</td>
<td>7 (1)</td>
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<tr>
<td></td>
<td>Organization of validation workshops</td>
<td>-</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Users involved in the trials (requirements elicitation, testing and validation)</td>
<td>100</td>
<td>1000</td>
<td>10000</td>
</tr>
<tr>
<td></td>
<td>Registered members of the OSR User Group (Validation)</td>
<td>-</td>
<td>200</td>
<td>5000</td>
</tr>
<tr>
<td></td>
<td>Affiliated Partners (mainly science centers and museums)</td>
<td>-</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>EU Country Coverage</td>
<td>10</td>
<td>27</td>
<td>27</td>
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<tr>
<td>Dissemination</td>
<td>Presentations in conferences and workshops</td>
<td>5</td>
<td>15</td>
<td>20</td>
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<tr>
<td></td>
<td>Publications in scientific magazines</td>
<td>1</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Organization of dissemination workshops and conferences</td>
<td>2</td>
<td>2</td>
<td>2</td>
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<tr>
<td></td>
<td>Organization of dissemination events and “OpenScience Days”</td>
<td>-</td>
<td>5</td>
<td>10</td>
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<tr>
<td></td>
<td>Participation to EC clustering activities (organization of clustering events)</td>
<td>2 (1)</td>
<td>4 (2)</td>
<td>4 (2)</td>
</tr>
<tr>
<td></td>
<td>OSR Portal (single) hits</td>
<td>50,000</td>
<td>300,000</td>
<td>1,000,000</td>
</tr>
</tbody>
</table>
Target User and their needs

Targeted Users

- Students
- Teachers
- Museum Visitors
- Web Visitors

User Group Needs

- Access to high quality science content, motivating and meaningful learning activities.
- Organized interrelated digital content from different repositories.
- Need for meaningful learning activities.
- Preparedness for on-site visits of their students in science museums and science centres.
- Hands-on, problem-solving and inquiry-based approaches have to be part of the science curriculum.
- Development of communities of practice through networking and information exchange.
- Enriched content during their museum visit, pre- and post-museum web access to relevant digital information.
WorkPlan Description

- 36 month Project
- 8 WorkPackages
- 35 Deliverables

| WP1 | ECSITE |
| WP2 | EA/LRF |
| WP3 | HEUREKA |
| WP4 | INTRASOFT |
| WP5 | EA |
| WP6 | MENON/UBT |
| WP7 | JYU |
| WP8 | ECSITE |
WP1 Project Management

**Objectives**
To ensure high quality management for the OSR project. Includes the establishment of efficient decision-making processes, reporting, quality assurance and risk management. Ensures that all pre-described objectives of the consortium are achieved in a timely manner and that all the outputs are of the expected quality.

**Tasks**
- T1.1 Project Coordination and Reporting
- T1.2 Setup and operation of Project Administration Office
- T1.3 Communication & Meetings
- T1.4 Quality control & management assessment
## WP1 Project Management

### Milestones and expected result

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-1 (M1)</td>
<td>Kick-off meeting.</td>
</tr>
<tr>
<td>M-2 (M6)</td>
<td>2nd Consortium Meeting (Presentation of the OSR Educational Design, Best Practices in Digital Science Education Guidelines)</td>
</tr>
<tr>
<td>M-3 (M9)</td>
<td>Presentation of the Analysis of the Requirements</td>
</tr>
<tr>
<td>M-4 (M12)</td>
<td>3rd Consortium Meeting (Presentation of Scenarios of Use – Release of the OSR Portal)</td>
</tr>
<tr>
<td>M-5 (M18)</td>
<td>4th Consortium Meeting (Trials – First phase)</td>
</tr>
<tr>
<td>M-6 (M24)</td>
<td>5th Consortium Meeting (Trials – Second phase)</td>
</tr>
<tr>
<td>M-7 (M30)</td>
<td>6th Consortium Meeting</td>
</tr>
<tr>
<td>M-8 (M36)</td>
<td>Closing Conference</td>
</tr>
</tbody>
</table>

### Deliverables

<table>
<thead>
<tr>
<th>Deliverable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-1.1</td>
<td>OSR Project Management Guidelines (ECSITE).</td>
</tr>
<tr>
<td>D-1.2</td>
<td>Progress Reports (PR) (ECSITE).</td>
</tr>
<tr>
<td>D-1.3</td>
<td>Pre-financing requests (ECSITE).</td>
</tr>
<tr>
<td>D-1.4</td>
<td>Annual &amp; Final reports (ECSITE).</td>
</tr>
<tr>
<td>D-1.5</td>
<td>Financial statement (ECSITE).</td>
</tr>
<tr>
<td>D-1.6</td>
<td>Annual Quality Assurance Evaluation Reports (MENON)</td>
</tr>
</tbody>
</table>
Objectives
To demonstrate a new learning approach that crosscuts the boundaries between formal and informal learning settings by involving learners in extended episodes of playful learning.
To investigate the pedagogic aspects of the application of innovative metadata techniques,
To create a pedagogical framework that recognizes the diversity of personal learning styles and behaviours in different contexts and applications

Tasks
T2.1 Adopting the Contextualized Model of Learning
T2.2 Connecting Formal and Informal Science Learning
T2.3 Modelling Educational Pathways in OSR
T2.4 Educational Pathway Patterns
WP2 OSR Educational Design

**Milestones and expected result**
- M-1 (M1) Kick-off meeting
- M-2 (M6) 2nd Consortium Meeting (Presentation of the OSR Educational Design)

**Deliverable**
- D-2.1 OSR Educational Design (EA and LRF)
WP3 State-of-the-art and Requirements Analysis

**Objectives**
To analyze the state-of-the-art digital repositories in science education. The work will be focused on unveiling existing best practices in a) science education content organization and b) in metadata technological solutions.
To explore the ways that will enhance access to science museums and science centres digital educational content.
To provide comprehensive user requirements that will enable partners to establish a solid set of specifications for the scenarios of use and the tools that will be integrated to the OSR Portal.

**Tasks**
T3.1 Define common rules and procedures for best practices identification
T3.2 Analyze state-of-the-art and extract best practices
T3.3 Task Analysis
T3.4 User requirements elicitation
T3.5 Analysis and processing of user requirements
WP3 State-of-the-art and Requirements Analysis

Milestones and expected result

M-1 (M1) Kick-off Meeting
M-2 (M6) 2nd Consortium Meeting
M-3 (M9) Presentation of the Analysis of the Requirements

Deliverables

D-3.1 Procedures for best practices identification in digital science education (MENON and HEUREKA).
D-3.2 Best Practices in Digital Science Education Guidelines (description). (HEUREKA, EA and CERTH)
D-3.3 Task Analysis Procedure (HEUREKA)
D-3.4 Requirements elicitation Workshops (Introductory and Design) (EA)
D-3.5 Analysis of the Requirements (HEUREKA, EA, MENON)
WP4 Technology integration and customization

**Objectives**
To adopt and specialize the existing tools and technologies, in order to provide the user communities with a suite of software tools appropriate for creating and deploying online learning repositories, as well as populating them with existing educational resources.

To design and develop an online environment, the OSR Portal that will facilitate multilingual search, access and retrieval of educational resources from the participating science centres and museums.

**Tasks**
- T4.1 Specifications and Technical Design
- T4.2 Adaptation and Customization of system’s modules
- T4.3 System Interfaces
- T4.4 Analysis Tools
- T4.5 System integration and testing
- T4.6 The OSR Portal (improved version)
- T4.7 The OSR Portal (final version)
## Milestones and expected result

<table>
<thead>
<tr>
<th>Milestone</th>
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<tbody>
<tr>
<td>M-2 (M6) 2nd Consortium Meeting</td>
<td>Organization and planning of the technical team</td>
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<tr>
<td>M-3 (M9) Commencement of the technical work</td>
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<tr>
<td>M-4 (M12) 3rd Consortium Meeting</td>
<td>Release of the OSR Portal</td>
</tr>
<tr>
<td>M-5 (M18) 4th Consortium Meeting</td>
<td>Improvements and modifications based on user feedback</td>
</tr>
<tr>
<td>M-6 (M24) 5th Consortium Meeting</td>
<td>Release of the OSR Portal – improved version</td>
</tr>
<tr>
<td>M-7 (M30) 6th Consortium Meeting</td>
<td>Improvements and modifications based on user feedback</td>
</tr>
<tr>
<td>M-8 (M36) Closing Conference</td>
<td>Release of the OSR Portal – Final version</td>
</tr>
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## Deliverables

<table>
<thead>
<tr>
<th>Deliverable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-4.1</td>
<td>System specifications and Technical Design (INTRASOFT, İKH, VXU, CERTH).</td>
</tr>
<tr>
<td>D-4.2</td>
<td>OSR Portal (first version) (INTRASOFT, İKH, VXU, CERTH).</td>
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<tr>
<td>D-4.3</td>
<td>OSR Portal (improved version) (INTRASOFT, İKH, VXU, CERTH).</td>
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<tr>
<td>D-4.4</td>
<td>OSR Portal (final version) (INTRASOFT, İKH, VXU, CERTH).</td>
</tr>
</tbody>
</table>
WP5 Scenarios of use

**Objectives**
To provide scenarios of use for the OSR environment and the connected repositories of digital science content for different learning contexts (formal, informal).
To put the scenarios through an extensive user validation and to revise them accordingly.

**Tasks**
- T5.1 Scenarios Design
- T5.2 Content Adaptation and Integration
- T5.3 Scenarios Development
- T5.4 Scenarios Integration
# WP5 Scenarios of use

## Milestones and expected result

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-1 (M6) 2nd Consortium Meeting</td>
<td>Organization and planning of the scenario development team – Deployment of the initial scenarios of use</td>
</tr>
<tr>
<td>M-3 (M9) Determination of the scenarios of use - Content Adaptation and Integration</td>
<td></td>
</tr>
<tr>
<td>M-4 (M12) 3rd Consortium Meeting</td>
<td>Release of the Scenarios of Use</td>
</tr>
<tr>
<td>M-5 (M18) 4th Consortium Meeting</td>
<td>Improvements and modifications based on user feedback</td>
</tr>
<tr>
<td>M-6 (M24) 5th Consortium Meeting</td>
<td>Release of the Scenarios of use for Dissemination purposes</td>
</tr>
<tr>
<td>M-7 (M30) 6th Consortium Meeting</td>
<td>User feedback from the Validation</td>
</tr>
<tr>
<td>M-8 (M36) Closing Conference</td>
<td>Presentation of the scenarios to the academic community and the wider public</td>
</tr>
</tbody>
</table>

## Deliverables

- D-5.1 OSR Usage Scenarios (EA).
- D-5.2 OSR Usage Scenarios for Dissemination Purposes (EA).
## WP6 Trials and Validation

### Objectives
To provide extensive validation of all aspects of the OSR approach and methodology in a wide variety of usage contexts.

### Tasks
- T6.1 Setup and management of the OSR users’ community
- T6.2 Determination of the implementation parameters
- T6.3 Development of validation plan
- T6.4 Development of validation & feedback tools
- T6.5 Training Workshops and in-service seminars
- T6.6 Piloting with the users (first phase)
- T6.7 Piloting with the users (second phase)
- T6.8 Validation (first phase)
- T6.9 Validation (second phase)
- T6.10 Integration of results - Validation Report
MUSEUM-SCHOOL COOPERATION FOR IMPROVING THE TEACHING AND LEARNING OF SCIENCES

European Cooperation project, funded by the Comenius 2.1 programme (Socrates) of the European Union

The SMEC workshop

The course aims to improve the teaching of science

The participants will cover their own course fees and travel expenses

Fourth edition

After the great success of the Deutsche Museums Summer School, the fourth edition of the course is organized.

en || it || fr || de || nl
Building a community of practice

http://www.inspirational-science.blogspot.com/
WP6 Trials and Validation

**Milestones and expected result**
- M-2 (M6) 2nd Consortium Meeting (Organization and planning of the validation team)
- M-3 (M9) Validation Plan
- M-4 (M12) 3rd Consortium Meeting (First phase of implementation/validation)
- M-5 (M18) 4th Consortium Meeting (Interim validation results)
- M-6 (M24) 5th Consortium Meeting (Second phase of implementation/validation)
- M-7 (M30) 6th Consortium Meeting (Integration of results)
- M-8 (M36) Closing Conference (Validation Report)

**Deliverables**
- **D-6.1** Validation plan (MENON, UBT and CERTH)
- **D-6.2** Validation tools (MENON and UBT)
- **D-6.3** Training workshops (including training materials, guides, proceedings) (EA)
- **D-6.4** Validation Report (MENON, UBT and CERTH)
WP7 The Roadmap towards a standardized Science Resources (re-)usability approach

**Objectives**
To generate a structured set of recommendations and that will form a pan European roadmap for Science learning services to sustain the development/deployment of science educational content services that will supported the access and expand the reuse it

**Tasks**
T7.1 European Commission’s Clustering Activities
T7.2 Pre-standardization Clustering Activities
T7.3 Integration of the recommendations
T7.4 Integration of recommendations from external standardization bodies
T7.5 The Roadmap towards a standardized Science Resources (re-) usability approach
WP7 The Roadmap towards a standardized Science Resources (re-)usability approach

### Milestones and expected results

- **M-4 (M12) 3rd Consortium Meeting** (Planning of clustering activities)
- **M-5 (M18) 4th Consortium Meeting** (Initial input from the Validation)
- **M-6 (M24) 5th Consortium Meeting** (Draft version of the Roadmap)
- **M-7 (M30) 6th Consortium Meeting** (Feedback from the partners and external bodies)
- **M-8 (M36) Closing Conference** (Final version of the Roadmap)

### Deliverables

- **D-7.1** Roadmap towards a standardized Science Resources (re-)usability approach (draft version). (JYU)
- **D-7.2** Meetings and research workshops with external experts (Agendas, guidelines, recommendations, action plans). (JYU)
- **D-7.3** Roadmap towards a standardized Science Resources (re-)usability approach (final version). (JYU)
**WP8 Awareness and dissemination**

**Objectives**
To raise awareness levels concerning the OSR initiative, disseminate its results and exploit in a sustainable way the ensuing approach.
To engage in significant cross-project clustering and networking in order to promote its recommendations and build a wider consensus by incorporating results from similar networks, projects and initiatives.

**Tasks**
- T8.1 Development of awareness and dissemination plan
- T8.2 Preparation of awareness and dissemination materials
- T8.3 Web site development
- T8.4 Organisation of Dissemination and Research Workshops
- T8.5 Annual OSR Conferences
- T8.6 Organisation of “OpenScience” Days
- T8.7 Organisation of the “OSR” Contests
- T8.8 Presentations to conferences and workshops – Publications
- T8.9 Press Releases
### WP8 Awareness and Dissemination

#### Milestones and expected result

- **M-1 (M1) Kick-off meeting** (Planning and organization of the dissemination strategy).
- **M-4 (M12) 3rd Consortium Meeting** (Release of the OSR Portal – Organization of 1st Annual Conference)
- **M-5 (M18) 4th Consortium Meeting** (Organization of OpenScience Days – Workshops – Summer schools)
- **M-6 (M24) 5th Consortium Meeting** (Organization of 2nd Annual Conference)
- **M-7 (M30) 6th Consortium Meeting** (Organization of OpenScience Days – Workshops – Summer schools)
- **M-8 (M36) Closing Conference** (Presentation of the project outcomes to the research community and to the wider public)

#### Deliverables

- **D-8.1 OSR Awareness and Dissemination Plan** (ECSITE)
- **D-8.2 Web site** (EA)
- **D-8.3 Project poster** (EA)
- **D-8.4 Project brochure** (ECSITE)
- **D-8.5 Dissemination materials** (Multimedia Project Presentations, leaflets, DVDs) (EA)
- **D-8.6 Dissemination workshops** (Proceedings) (ECSITE, BMUKK, MENON, EA, LRF, DM, HEUREKA, EF, MNST, CSI, CPK, CVPK)
- **D-8.7 Research workshops** (Proceedings) (UBT, CERTH, VXU, JYU, ISKME, UCF)
- **D-8.8 OSR Conferences** (ECSITE, EA, CVPK)
- **D-8.9 OSR Contests for students and Teachers** (Guides, examples, websites) (EA, BMUKK)
- **D-8.10 OpenScience Days** (dissemination materials) (ECSITE, BMUKK, EA, CSI, CVPK, VXU, UCF)
- **D-8.11 Presentations to conferences – Publications** (All partners)
- **D-8-12 Press Releases** (All partners)
Dissemination Activities

• **The OSR Portal:** It will be a sustainable service, providing access to high quality digital content offered by the members of the consortium

• **Publication and Circulation of Newsletters:** Newsletters will be published periodically to communicate the project’s activities and the consortium’s achievements

• **Organisation of Research and Dissemination Workshops** in the framework of major International or national events (e.g. Ecsite Annual Conferences, ESOF – European Science Open Forum – Conferences, IEEE conferences and workshops)

• **Organisation of “OpenScience” Days:** During the life cycle of the project’s activities a series of demonstration workshops and info days will be organized by the consortium in European science museums

• **Annual OSR Conferences:** During the life cycle of the project three international conferences will be organized (one each year).

• **Production and distribution of dissemination material,** which includes DVDs, posters, leaflets, project electronic newsletter as well as users’ guides
Dissemination Activities

• **Presentations and publications of the project’s achievements.** The consortium will make an exact plan so that the research results of the project to be presented in numerous conferences and workshops.

• **Organization of the OSR Contests.** The OSR consortium will organise a series of national and international contests in order to motivate the teachers’ communities to be involved in the validation activities of the project.

• **Collaborate with related Thematic and Best Practice Networks funded by eContentplus**, providing input to and taking into account relevant outcomes.

• **Development of the OSR Users Community.** The OSR consortium through an extended dissemination campaign, which will include numerous user-centred activities.
Ecsite covers a network of 385 members worldwide, about 180 Science centres and museums in Europe visited by 40 millions persons per year and many more through their websites.

The participating Science Centres and Museums are visited by more than 5 millions persons per year.

Each Ecsite AC has more than 1000 participants.
# Meetings and Events

<table>
<thead>
<tr>
<th>Meeting/Event</th>
<th>Date (Project month)</th>
<th>Participants</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kick-off Meeting</td>
<td>1</td>
<td>Project Partners</td>
<td>Brussels</td>
</tr>
<tr>
<td>Project Meetings</td>
<td>6, 12, 18, 24, 30, 36</td>
<td>Project Partners</td>
<td>Athens, Munich, Milano, Paris, Lisbon, Budapest,</td>
</tr>
<tr>
<td>OSR Annual Conferences</td>
<td>12, 24, 36</td>
<td>Teachers, Researchers, Wider Public</td>
<td>Brussels, Athens, Lisbon</td>
</tr>
<tr>
<td>OpenScience Days</td>
<td>6 - 36</td>
<td>Teachers, Students, Museum Visitors</td>
<td>Brussels, Athens, Paris, Vienna, Lisbon, Jyväskylä, Vaxjo, Orlando, Orlando</td>
</tr>
<tr>
<td>Dissemination Workshops</td>
<td>12-36</td>
<td>Teachers, Students, Museum Visitors</td>
<td>All over Europe</td>
</tr>
<tr>
<td>Research Workshops</td>
<td>12 - 36</td>
<td>Researchers, Tel, experts, Museum Staff, Exhibition designers</td>
<td>Munich, Paris, Helsinki, Budapest, Athens, Lisbon, Milano</td>
</tr>
<tr>
<td>Training Workshops</td>
<td>12-36</td>
<td>Teachers, Museum Staff</td>
<td>Munich, Paris, Helsinki, Budapest, Athens, Lisbon, Milano</td>
</tr>
<tr>
<td>Summer Schools</td>
<td>(once a year)</td>
<td>Teachers, Museum Staff</td>
<td>Crete, Greece</td>
</tr>
</tbody>
</table>
Resources allocation

Distribution of Project Budget among various categories

- Personnel: 72%
- Indirect Costs: 21%
- Other Cost: 2%
- Travel: 5%
Total Person Months per WorkPackage

- WP1
- WP2
- WP3
- WP4
- WP5
- WP6
- WP7
- WP8
Distribution of Project Effort per Partner Category

- Formal Education Providers: 26%
- Informal Education Providers: 41%
- Technology Partners: 17%
- Standardization & Evaluation Partners: 16%
Distribution of Effort in Workpackages per Partner Category

- WP1
- WP2
- WP3
- WP4
- WP5
- WP6
- WP7
- WP8

Categories:
- Formal Education Providers
- Informal Education Providers
- Technology Partners
- Standardization & Evaluation Partners