Digital School II
Photodentro OER Repositories & National Aggregator,
Interactive Textbooks, and Digital Educational Platform e-me

Elina Megalou
Dep. Director of the Strategy & Digital Educational Content Directorate @CTI
LRE-subcommittee Chair

http://dschool.edu.gr/

Athens, 24-25 April 2017
Digital School I Program: Priority Axes & Actions

Digital School I

Digital Educational Platform, Interactive Textbooks, and Learning Object Repositories”

Coordinated and implemented by CTI
Duration: 5 years (2010-2015)
Budget: 8.7 M euro

~ 200 teachers, academic professors, pedagogical and domain experts,
~ 80 engineers and technical personnel

European Social Fund
Best Practice in Greece (ranked 4th)
Digital School content-based e-Services

http://dschool.edu.gr

Open Educational Resources (OERs)

ebooks.edu.gr

Interactive Textbooks

photodentro.edu.gr

Photodentro Digital OER Repositories

eme.edu.gr

e-me Digital Educational Platform for pupils and teachers
Digital School - Digital Educational Content
home page: dschool.edu.gr
Digital School content-based e-Services

http://dschool.edu.gr

Interactive Textbooks

Photodentro OER Repositories & National Aggregator

Digital Educational Platform e-me
Interactive Textbooks

The official portal of the Greek MoE for hosting and delivering digital school textbooks

600,000 unique visitors per month
Interactive Textbooks

e-books.edu.gr

Digital textbooks (e-books) for all school classes, in multiple digital formats (expressions) suitable for different uses:

- 200+ textbooks in html format
- Full sets of textbooks (including teacher guides and student workbooks) in pdf format for 300+ lessons
- Textbooks for visually impaired students (ambyopia) (800 volumes)
- 26 textbooks in iBook format

- 100+ textbooks enriched with interactive, click & play OERs
Enriched e-textbooks

- a vehicle for smooth transition towards familiarization of teachers with digital learning resources
- a good, alternative for associating resources with learning goals of the curriculum
- a familiar browsing interface for teachers to navigate through learning resources
Interactive Textbooks
e-books.edu.gr

Textbook enrichment process: triggered the development of 6,000 new OERs for all school subjects

active participation of the educational community

150 qualified teachers in 13 domain-specific supervised groups
12 scientific coordinators (academic professors)
Digital School content-based e-Services
http://dschool.edu.gr

Interactive Textbooks
Photodentro OER Repositories & National Aggregator
Digital Educational Platform e-me

ΔΙΑΔΡΑΣΤΙΚΑ ΣΧΟΛΙΚΑ ΒΙΒΛΙΑ
ΦΟΤΟΔΕΝΤΡΟ
Εθνικός Συσσωρευτής Εκπαιδευτικού Περιεχομένου
Φωτόδεντρο
Αποθετήριο Εκπαιδευτικών Βιβλίων
Φωτόδεντρο
Αποθετήριο Εκπαιδευτικού Λογισμικού
Φωτόδεντρο
Ε-γλύκο Χρηστών
Φωτόδεντρο
Αναπτυξιακές Εκπαιδευτικές Πρακτικές
Φωτόδεντρο
Πολίτικας

e-me
Ψηφιακή Εκπαιδευτική Πλατφόρμα για μαθητές και εκπαιδευτικούς

e-me
https://e-me.edu.gr

e-me για όλους
https://4all.e-me.edu.gr
Photodentro OER Repositories
Learning Objects

Small, reusable units of learning
Semantically autonomous
Open Licenses (CC BY NC SA)

http://photodentro.edu.gr/lor

Apr 2017: ~8,400 Learning Objects
OER Collections

Interactive, click-and play Learning Objects developed for enriching school textbooks

learning objects and learning scenarios developed in various nationally-funded projects of the Greek MoE (1996-2009)
Educational Video

Short length (<10min)
Curriculum related
Core-concept, suitable for in class use
Open Licenses (CC BY NC SA)

http://photodentro.edu.gr/video

Apr 2017 : ~ 1000 video
~700 short-length video of the Greek Educational Television

- Documentaries from European countries on sustainable energy issues
- Award winning student videos in EU contest
Photodentro Video

Browsing based on the pedagogical use of video in learning activities

Example: Compare & Contrast
Educational Software
(for download)

- Educational multimedia titles
- Sets of learning scenarios
- Educational Software Tools
- Open learning environments

http://photodentro.edu.gr/edusoft

Apr 2017: 140 educational software
Photodentro Browsing & Searching

Browsing by Subject

Browsing by Learning Resource Type

Using Filters

Search within results

Filters

- Educational Context
- Student Age
- Learning Resource Type
- Quality certifiers
- Funding
- Language
- Foreign Language Competences
- Special Needs
- Teaching Approach
- Educational Objective
- Subject Areas

13 three-level thematic classification taxonomies
Photodentro Browsing & Searching

Browsing through Collections
PHOTODENTRO LOM-GR APPLICATION PROFILE

Photodentro Semantic Interoperability

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REFERENCES:
http://photodentro.edu.gr/dl/519141006
Resource URL:
http://photodentro.edu.gr/dl/519141006

CONTRIBUTION & FUNDING

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Elina Megalou @CTI, April 2017
Photodentro Technical Implementation

Based on DSpace open source Repository Management system

Apache Tomcat
Java 2EE container

It provides an Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH) target
Photodentro QA process

User Roles & Content Population Workflow

Repository quality-checked content
Educational Repositories with teacher-generated content
User Generated Content

Open Educational Resources

Goals:
- Provide a place where teachers can publish and share their own Open Educational Resources
- Build a community of teachers

Overall Approach:
Trust teachers first

No prior evaluation of resources
Teachers have Public Profile

http://photodentro.edu.gr/ugc

Apr 2017 : 693 teacher-generated learning objects
693 teacher-generated learning objects
OPEN EDUCATIONAL PRACTICES
Greek initiative

- Boost the use of existing Educational Content Repositories
- Motivate teachers to use, reuse & remix OERs
- Foster Open Practices in Education
- Encourage sharing of Open Educational Practices
- Develop active communities of practice on resource-based learning
Open Educational Practices

Reusable teaching practices on resource-based learning

OEPs
- draw upon the use, reuse, or creation of OERs
- have been implemented in a real educational setting
- their creators openly share results, experiences & reflections

http://photodentro.edu.gr/oep
1. Short Description of OEP
2. Open Educational Practice design and didactic goals
3. The educational context where the OEP has been applied
4. OEP detailed description:
   • how OERs have supported learning activities
   • how pupils have been involved in the process
5. List of OERs used, reused or produced
6. Documentation of the OEP extensibility and reusability
   - Results / Impact (added value, unexpected pedagogical outcomes…)
   - Innovative characteristics / Relation with existing OEPs
   - Extensibility / Reusability to other educational contexts
6. Other resources
i-participate Action
Supporting and motivating teachers
i-participate Action
Supporting and motivating teachers

Regional Ambassadors
- Organize local /regional events & workshops
- Increase teachers’ awareness on existing OERs and repositories
- motivate and support teachers
- Support the OEP contest

http://i-participate.gr
Open Educational Practices Contest

1st Hellenic Contest on Open Educational Practices in primary and secondary education

Awarded best open educational practices in using OERs in school education

creative and constructive use of open, digital educational content in the learning process

• 4 categories (one for each educational level)
• Open for 3 months

Provided for 3 winners from each category (a category for each educational level)
Open Educational Practices Contest Criteria

Overall pedagogical approach and Innovation

Focus on 21st century skills
- Thinking skills (problem solving, critical thinking, logical, numerical)
- Communication skills (reading, writing, speaking, listening)
- Teamwork skills
- Ability to adapt to changing circumstances
- Ability to learn independently
- Networking and Social Skills

Innovative pedagogical practices and methodologies

Quality of Open Educational Practice Description

Importance, Usefulness, Reusability and Extensibility
Sixty five (65) OEPs submitted within 3 months

Quality badges

good and best educational practices
Photodentro Greek National Aggregator of Educational Content

Photodentro portal
central access point to school-based learning resources in Greece

Photodentro Aggregator system
national service for harvesting educational metadata from various external repositories and collections

http://photodentro.edu.gr

April 2017: access to >17,500 OERs
Photodentro Greek National Aggregator of Educational Content

15 Educational Repositories

~18,000 learning objects

17 content providers
Photodentro Greek National Aggregator of Educational Content: Portal

Faceted search

OER metadata page
Photodentro Layered Architecture

GREEK NATIONAL EDUCATIONAL CONTENT AGGREGATOR

PORTAL

OAI-PMH

Search API

PHOTODENTRO PORTAL

PHOTODENTRO AGGREGATOR SYSTEM

Metadata Validator
Harvester
Repository Services

PHOTODENTRO MEXT (Resource Selection & Metadata Enrichment)

OAI-PMH

EDUCATIONAL CONTENT NATIONAL AGGREGATION SERVICE

AGGREGATION LAYER

OAI-PMH

Photodentro LOR
Photodentro Video Repository
Photodentro UGC Repository
Photodentro Cultural Thematic Aggregator

External Collection 1 (e.g. cultural)
External Collection 2 (e.g. educational)

... External Collection n (e.g. scientific)

COLLECTION MANAGEMENT LAYER
Photodentro MEXT: an intermediate system to support selection of harvested resources, metadata mapping, and metadata enrichment.
OER Selection

Select resources from external OER collections

Metadata enrichment

Enrich OERs with educational metadata according to Photodentro IEEE LOM GR Application Profile

http://photodentro.edu.gr/mext
Cultural Educational Objects

Selected cultural resources from Europeana collections, enriched with educational metadata

Europeana

200,000

Photodentro MEXT

7,400

April 2017: access to >6,500 cultural resources

http://photodentro.edu.gr/cultural
Selected cultural resources from Europeana collections, enriched with educational metadata
metadata enrichment form
Photodentro Repository Infrastructure

90,000 unique visitors per month
Photodentro Microsites:

Light-weight web sites, web page or cluster of pages support certain views of the Photodentro harvested content.

The microsite's main landing page can have its own design and domain name.

http://micro.photodentro.edu.gr/english2015/
Vocabulary Bank
Manages taxonomic schemata (controlled vocabularies, taxonomies, and thesaurus)

Photodentro IEEE LOM GR application profile
Web based environment for the management of terms (relations, translations, version control)

Target audience: content providers, repository owners, metadata authors

Powered by TemaTres open source vocabulary server

http://vocbank.photodentro.edu.gr/
Photodentro Quality Seals Conceptual Model

- **Certifier (1)**
  - **Process (N)**
  - **Evaluation Criteria (N)**
  - **Brand Name (N)**

- **Stamping (N)**
  - **Learning Object (N)**
  - **Collection (N)**
Photodentro Quality Seals

Quality seals for digital educational content

provided by: organizations, institutes, authorities, or groups (e.g. project consortia)

QA Records
result of the process, based on a quality seal

Registry of Certifiers

http://photodentro.edu.gr/seals
Photodentro Quality Seals

IEEE LOM metadata AP

Quality seals
- Quality Seal Title
- Description
- Version
- Coverage
- Evaluation Type
- Educational Context
- Target Audience

...
Interactive Textbooks

Photodentro OER Repositories & National Aggregator

Digital Educational Platform e-me

http://dschool.edu.gr
Welcome to e-me Digital Educational Platform for pupils and teachers

Login with a Greek School Network (GSN) account

195 Students | 1398 Teachers | 93 Hives

To explore e-me features, click here

e-me: the Hellenic Digital Educational Platform provided by the Greek MoE to the K-12 community of more than 1,100,000 pupils and 100,000 teachers
e-me: Digital Educational Platform for students & teachers

http://e-me.edu.gr

e-me

a social learning environment, where all members of the primary and secondary education community can safely share content, connect and collaborate with peers, publish their work, and use a large number of embedded applications

Personal Learning Environment (PLE)

Open Source implementation
e-me fundamental principles

Pupils first
appealing them to adopt e-me in their everyday activities

Smooth transition to the digital world
use of real-world metaphors

Competing with the market: not a sustainable model
(developing infrastructures with public funds)
  • a “container” of apps
  • keep sensitive data and apps in regulated infrastructures
  • allow integration and use of familiar tools and services
  • open up the platform for 3rd party apps (trusted app store)
e-me core functionality

- Personal storage, cloud-based file sharing
- Social networking
- Communication
- Workgroups and collaboration spaces
- Publishing tools
- Trusted store of (free) e-me apps
e-me open call for requirements

open call for requirements from all interested parties (pupils & teachers)

ideas, suggestions, best practices, descriptions of intended usage
e-me home: Personal learning environment for pupils and teachers

e-me: “it grows with me!”
two versions: e-me official & e-me for all

e-me (official)
http://e-me.edu.gr

e-me for all
http://4all.e-me.edu.gr

certified teachers & pupils (LDAP)  
Simple registration
two versions: e-me official & e-me for all

e-me demo

http://demo.e-me.edu.gr
e-me: personal profile

✓ Personal profile

Picture or Avatar
Text: introduce yourself
moto

Hives I participate
Hives I follow
Private / Public

customable profile pages for all e-me members
e-me contacts: building your social network

e-me social network:
✓ contacts (friends)
✓ groups (hives)
✓ communities

contacts (friends)
✓ manage friend requests
✓ block / delete contacts
e-me settings: personalize your working environment

Settings

- official picture
- background
- notifications
e-me files: cloud-based personal storage space

- Organize / share files & folders
- Drag & Drop
- Files synchronization
e-me Hives: collaboration spaces

Hive:
- key structural component of e-me
- main collaboration space for pupils and teachers

✔ created by pupils & teachers

Various forms:
- Regulated spaces for pupils of a classroom
- Closed collaboration spaces
- Workgroups around a certain topic
- Open communities, as public spaces of common interest
inside e-me Hives

✓ Each Hive has
  ▪ members (upon invitation and approval)
  ▪ customizable desktop
  ▪ “wall” for communication
  ▪ personal & shared files /folders
  ▪ e-me apps

Membership
Each hive has
• a leader
• assistants”
• and “members” who are invited or request to join in
Each Hive has
- members (after invitation and approval)
- customizable desktop
- “wall” for communication
- personal & shared files /folders
- e-me apps

Membership
Each hive has
- a leader
- assistants
- and “members” who are invited or request to join in
Create a new Hive: public / private

**Public Hive**
- wall public or private
- supports followers
- public files folder
- shows on search results

**Private Hive**
- wall private only
- private files
- hide from search results
**Asynchronous messaging among contacts, with embedded notifications**

**e-me hive’s “Wall” - a space where all hive’s members can post and comment**
e-me portfolio

Organize your e-portfolio

e-portfolio Record
  Title
  Thumbnail
  Description / Justification
  Academic/School year
  Files
  Links
  Tags
  Visible (contacts/nobody/all)
  Creation Date
e-me apps & e-me Store: extending the functionality of e-me

✓ Online repository of e-me apps

![e-me apps](image)

### e-me apps
- Sign Language Dictionary
- [Other apps](image)

### e-me Hive apps
- Class Plan
- Poll
Class Plan

e-me apps: examples
**e-me: SYSTEM ARCHITECTURE**

**AUTH - SESSION CONTROL - PROXY**
The proxy handles all user requests. It manages authentication and session control and routes request to the relevant component of the e-me system's architecture.

**e-me REST API**
Serves as the glue component for extending e-me with internal e-me apps, as well as with external cloud tools and services.

**MESSAGE BUS (based on REDIS)**
Implemented with REDIS, it holds session details, authorisation tokens and volatile data (notifications, alerts, etc.)

**e-me HOME & HIVES**
The main UI of the platform: Home holds shortcuts for all functionality, tailored by each member; Hives are learning/working spaces for groups.

**MESSAGING & NOTIFICATIONS**
Allows social messaging among e-me members and notifications from all relevant activities.

**DATABASE (MongoDB)**
A NO-SQL storage that stores documents as JSON objects. A dedicated module handles content indexation through a REST API.

**CLOUD STORAGE**
Support for sharing among e-me members and synchronisation to local devices.

**LDAP**
Directory Server for Greek K-12 schools, serving non-sensitive user details.
New project: Digital School II (2017-2018)

Title: Expanding and Exploiting the Digital Educational Platform e-me, the Interactive textbooks and the Photodentro OER Repositories & National Aggregator (Digital School II)

Duration: April 2017 - Dec 2018

Budget: 2.4 M euro

Coordinator & Implementer: CTI
Strategy & Digital Educational Content Directorate

Funding: NSRF 2014-2020
Operational programs: Human Resources Development, Education and Lifelong Learning

~ 35 engineers and technical personnel
~ 60 teachers, academic professors, pedagogical and domain experts
New project: Digital School II (2017-2018)

Expands, evolves and operates on a large scale supporting a large number of students and teachers

Improves / Extends core functionality

- e-me files (smart folders)
- e-me appStore
- Synchronous communication (WebRTC)

New apps

- e-me Blogs
- e-me content
- e-me assignments

The educational community is invited to participate with ideas and development of "e-me apps" adding new functionality

New apps
New project: Digital School II (2017-2018)

Photodentro Digital OER Repositories
photodentro.edu.gr

Photodentro Repositories are improving and expanding

New Photodentro repositories
Goals & Needs

- Increase the number of learning resources that Photodentro Aggregator can directly harvest
- Keep the content quality high
- Keep the metadata quality high
- Broaden the adoption of Photodentro IEEE LOM metadata application profile, thematic taxonomies and vocabularies

Educational Organizations & Institutions

- are in need of repository infrastructures that allow them to share educational content
- limited or no resources to support such software projects in-house

Software as a Service (SaaS) is a software delivery model that provides access to software and its functions remotely, usually as a Web service
CASE 1: Hosting single OERs

Need to publish / host a single OER on a Photodentro Repository

Example OER: An educational resource developed in the context of an EU project

Why: Take advantage of the large number of Photodentro users (schools, teachers, pupils)

Photodentro software is already there - No customisation options

Service:
Well-defined authorisation & QA policy
Workflow process

Quality Seals
CASE 2: Hosting OER collections

Need to publish / host a whole collection of OERs

Example : Deykalion collection of 100 OERs for physical phenomena by Ioannina Univ.

Requirement: Experience in LOM-based metadata authoring

Limited customisation options (logos, quality seals, thumbs)

Service:
Create a new collection in an existing Photodentro repository
Give content provider full control to manage its own collection (collection administrator role)

Provide training & consulting in the metadata authoring process
CASE 3: A Custom OER Repository (Hosted deployment approach)

Need to clone & customise an existing Photodentro repository

Why: to support a certain type of learning resources or to fulfil a specific need

Example: A Photodentro clone for the Pedagogical Institute of Cyprus

Customization Level: vary from very small changes to full customisation

Service:
- Analyze user demands
- Clone a Photodentro Repository
- Customize it to meet the needs of the organization
- Provide training, consulting and technical support

A typical hosted solution: an individual copy of an application is deployed as a single installation per client

maximum configurability

not a viable option for the large scale
CASE 4: A Custom OER Repository (Hosted deployment approach)

Click-and-clone: Create “my own copy “of Photodentro Repository “on the fly”

Who: schools, small organisations, educational departments in larger organisations, ...

Why: uploading and publishing their OERs without bothering with technical details

Light customisation of the GUI is in most cases enough

Service:

Typical Software as a Service model (SaaS model)
New project: Digital School II (2017-2018)

Interactive Textbooks

textbooks enrichment

e-pub format

Photodentro e-Books
Photodentro e-Books conceptual scheme (draft)

FRBR (Functional Requirements for Bibliographic Records)
IMS EDUPUB, Learning Object eXchange (ILOX)

digital expressions
various digital forms of the WORK (master textbook)

high-quality pdf for printing
pdf for on-line distribution
html
enriched html
e-pub for partially-sighted

manifestations
(versions of a digital expression)

InDesign, 2015, CTI
2009, OEDB
InDesign, 2015, CTI
2011
2015
DS I, 2013
2016
New project: Digital School II (2017-2018)

Photodentro National Aggregator
photodentro.edu.gr

Photodentro Content Aggregator Service for content providers

External Resources → Metadata Records → Resource Selection & Metadata Enrichment → Enriched Metadata Records → GREEK NATIONAL EDUCATIONAL CONTENT AGGREGATOR

Improve Photodentro MEXT system
A well defined workflow for aggregating new collections and repositories
Provide support to content providers for metadata mapping & enrichment
New project: Digital School II (2017-2018)

Open Educational Resources (OERs)

Some hundreds of new Open Educational Resources (OERs) for formal or informal, school and pre-primary education will be developed

non-functional OERs (e.g. flash, java) will be updated

Metadata annotation / authoring (centralized process)
Project’s Web site
dschool.edu.gr/p61cti/
Thank you!
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