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HEAL-Link activities and plans on annotating, organizing and linking academic content

Contributors:
N. Mitrou, N. Konstantinou, D. Kouis, P. Stavrou, D. Spanos

Presentation by
Prof. Nikolas Mitrou, NTUA
HEAL-Link chairman

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HEAL-Link profile in numbers

Hellenic Academic Libraries-Link (known as HEAL-Link) was founded in 1998

- **Members & Associated Members**: > 50 Higher Education Institutes, Research Centers and other Public Sector Organizations
- **Cooperating organizations**: > 30 Public and Private Sector Libraries and Organizations
- **Academic & Research community**: > 13.000 academic staff (faculty members & researchers)
- **Students:** > 350.000 under/post graduate students
- **On line content** : > 14.000 scientific journals, 30.000 eBooks, various digital databases etc. > 4.000.000 bibliographic records
- **Current ongoing projects:** > 13 M€ funding for upgrading/creating digital services

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HEAL-Link main action lines

- **Economise** resources
- Provide improved services for supporting teaching and research within academic units
- Set a **common strategy** regarding **access** to **digital material**, allowing information sources to be managed effectively state-wide
- Promote adoption of common performance standards and indices for library services
- Coordinate the development of the collections of the member-libraries

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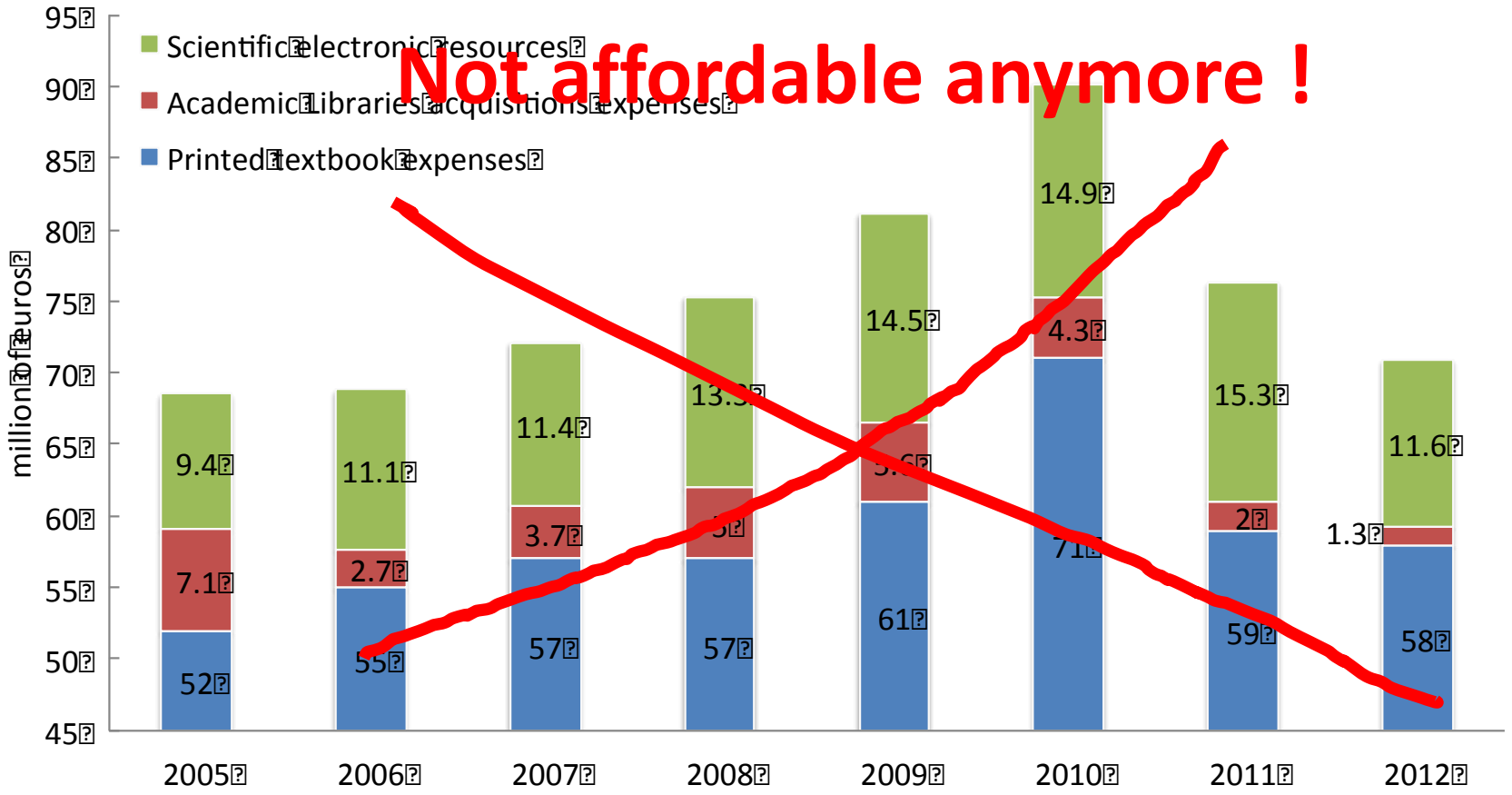
Expenditure for access to academic textbooks and scientific on-line sources



HEAL-Link's current activities towards Open Access

Two **co-financed** projects (national & EU funds):

- **Advanced Central Services of HEAL-Link's Open Access Digital Libraries** (2010-2015, 4.5M€)
- *> 30 projects executed by Academic Libraries (HEAL-Link members) with a total budget exceeding 23 M€*
- **Hellenic Academic E-books** (2012-2015, 8.3M€)

European Union
European Social Fund

OPERATIONAL PROGRAMME
EDUCATION AND LIFELONG LEARNING
investing in knowledge society
MINISTRY OF EDUCATION & RELIGIOUS AFFAIRS
MANAGING AUTHORITY

NSRF 2007-2013
EUROPEAN SOCIAL FUND

Co-financed by Greece and the European Union

European Union
European Regional Development Fund

digitalgreece
Everything is possible
Operational Programme "Digital Convergence"

NSRF 2007-2013

The project is co-financed by Greece and the European Union

Advanced Central Services of HEAL-Link's Open Access Digital Libraries

HEAL-Digital resources and Institutional Repositories service (HEAL-DIR)

- Supporting and coordinating actions within the individual academic institutions in order to develop and/or upgrade their own institutional repository conforming to common standards which enable interoperability
- A common physical infrastructure and software platform for most Institutions
- A common set of metadata (healmeta)

- **HEAL Meta-search Service**

Advanced Central Services of HEAL-Link's Open Access Digital Libraries (cont.)

AMELib

(Accessible Multimodal Electronic Library)

AMELib digital repository provides books to print-disable students through a set of tools for converting printed books to audio-books as well as other forms.

Advanced Central Services of HEAL-Link's Open Access Digital Libraries (cont.)

HEAL-Link Catalogues and Authorities/Indexing Service (HEAL-CAS)

- **Electronic Authorities / Indexing Service**
  - Greek Researchers and Research Institutes
  - Greek Scientific Journals
  - Greek Scientific Digital Resources
- **ILSAS (Integrated Library System as a Service)**
- **Electronic plagiarism detection service**
- **HEAL-HelpDesk**

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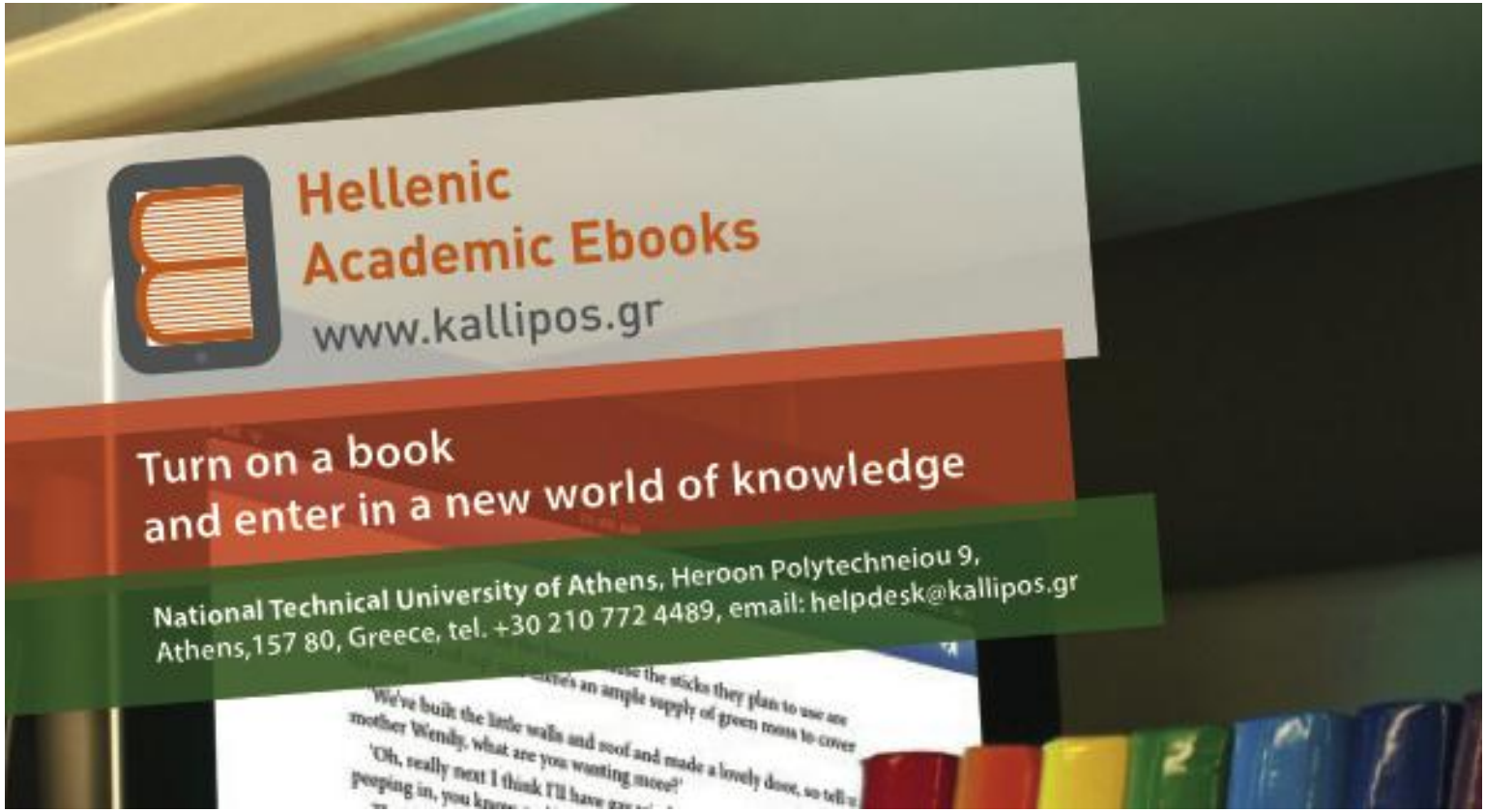
Hellenic Academic E-books



The service “Kallipos – Hellenic Academic Electronic books” aims to create and provide, in **open access**, a large number (more than 700 in the 1st phase) academic textbooks as e-books.

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Hellenic Academic E-books (cont.)

Main features:

- Content mainly in the greek language
- Open access
- Multiple formats (pdf & Epub)
- Interactive & multimedia elements (video, sound, simulations etc.)
- **Learning objects**
- **Complete metadata description (healmeta)**

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E-books vs e-courses

An e-book

- Is a linked collection of e-learning units, with a defined structure
- Is self-contained and portable within a standardized container, and presentable on special devices (e-readers)
- Has a unique theme and a defined sequence of reading
- Can contain multimedia elements and animations (enhanced e-book), as far as they can function locally
- Each stable edition can acquire a unique identifier (like the ISBN)
- Although outgoing links are allowed, all the basic building elements should be local, in order to assure the basic functionality in a non-connected mode

An e-course

- Is a loosely-bound set of e-learning materials
- Is provided usually by a Web server and presented by ordinary browsers
- Easy to incorporate multimedia elements, as well as animations in the form e.g. of servlets and applets
- Content can be changed dynamically. This may be a problem for assigning unique identifiers to individual content elements
- References to external components are easily handled

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Epub: an e-book container

Epub is a distribution and interchange format standard for digital publications and documents:

- Epub3 – the latest version
- Multiple resources wrapped into a single package
- (XHTML) HTML5 and SVG the primary content formats
- Multimedia and scripting supported (as defined in HTML5 and SVG)
- Human- and machine-readable navigation information
- Referencing document elements through the epubcfi (canonical fragment identifier)
- A minimal (but expandable) dc-based set of metadata
- Structural semantics

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A typical Epub3 container structure

application/epub+zip

myBook.epub

zip

- mimetype
- **[META-INF]**
  - container.xml
- **[OEBPS]**
  - package.opf
  - nav.xhtml
  - [css]
  - [fonts]
  - *.html
  - [svg]
  - [javascripts]
  - [images]
  - [mathml]
  - [audio]
  - [video]
  - [proprietary]

```
<?xml version="1.0" encoding="utf-8"?>
<container xmlns="urn:oasis:names:tc:opendocument:xmlns:container"
                        version="1.0">
 <rootfiles>
    <rootfile full-path="OEBPS/package.opf"
          media-type="application/oebps-package+xml"    />
 </rootfiles>
</container>
```

```
<?xml version="1.0" encoding="UTF-8"?>
<package version="3.0" xml:lang="en" unique-identifier="pub-uid"
        prefix="cc: http://creativecommons.org/ns#"
        xmlns="http://www.idpf.org/2007/opf">
  <metadata  xmlns:dc="http://purl.org/dc/elements/1.1/">
      <dc:identifier id=" pub-uid "> urn:uuid:A1B0D67E-2E81-4DF5-9E67-A
                                    64CBE366809    </dc:identifier>
      <meta property="dcterms:modified">2011-01-01T12:00:00Z</meta>
      <dc:language>gr</dc:language>
      <dc:title id="title">myBook-Title    </dc:title>
      <dc:creator id="creator1">N. Mitrou       </dc:creator>  ...
  </metadata>
  <manifest>
      <item id="nav" media-type="application/xhtml+xml"
            href="nav.xhtml" properties="nav"/>
      <item href="css/main.css" id="main.css" media-type="text/css" />
      <item href="chap01.xhtml" id="chap01.xhtml"
          media-type="application/xhtml+xml" properties="scripted"/>
      <item href="images/im1.jpg" id="im1.jpg" media-type="image/jpeg" />
      ....                                                    </manifest>
    <spine><itemref idref="chap01.xhtml" />
          <temref idref="chap02.xhtml" />    ...              </spine>
</package>
```

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Ebub: Identifiers

- **Unique EPUB identifier**
  - Fully qualified URI (not required by the standard, but strongly recommended)
  - Example

```
<package  …  unique-identifier=“pub-uid“>
  <metadata xmlns:dc="http://purl.org/dc/elements/1.1/">
    <dc:identifier id="pub-id“>urn:doi:10.1016/j.iheduc.2008.03.001</dc:identifier>
    <meta property="dcterms:modified">2013-11-26T12:00:00Z</meta>
    <meta refines="#pub-id“ property="identifier-type" scheme="onix:codelist5">06</meta> …
  </metadata>
```

  - Unique package identifier: unique EPUB identifier + last modified date

    e.g. urn:doi:10.1016/j.iheduc.2008.03.001@2013-11-26T12:00:00Z

- **Ebup canonical fragment identifier** (http://www.idpf.org/epub/linking/cfi/)
  - Defines a standardized method for referencing arbitrary content within an EPUB® Publication through the use of fragment identifiers
  - Syntax: myBook.epub#epubcfi(path , [range])
  - Example: myBook.epub#epubcfi(/6/4[chap01ref]!/4[body01]/10[para05]/3:10)

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Why Epub ?

Main assets

- **Uses the web standards and technologies (HTML5, SVG)**
- **Is promoted by big names in the publishing industry**

  (e.g. the Association of American Publishers/AAP)

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Learning objects

- Definition: "any entity, digital or non-digital, that may be used for learning, education or training" (IEEE)
- Features:
  - "small" entities (typical duration of presentation or reading: 5-20 minutes)
  - self-contained in their own micro-container (file, folder, etc)
  - uniquely identifiable, accessible and portable
  - have an educational value
  - reusable in compositions of larger LO (e.g. e-books)
- Examples:
  - interactive figures or maps
  - algorithms
  - mathematical theorems
  - audio-video elements
  - slide shows
  - book chapters or sections

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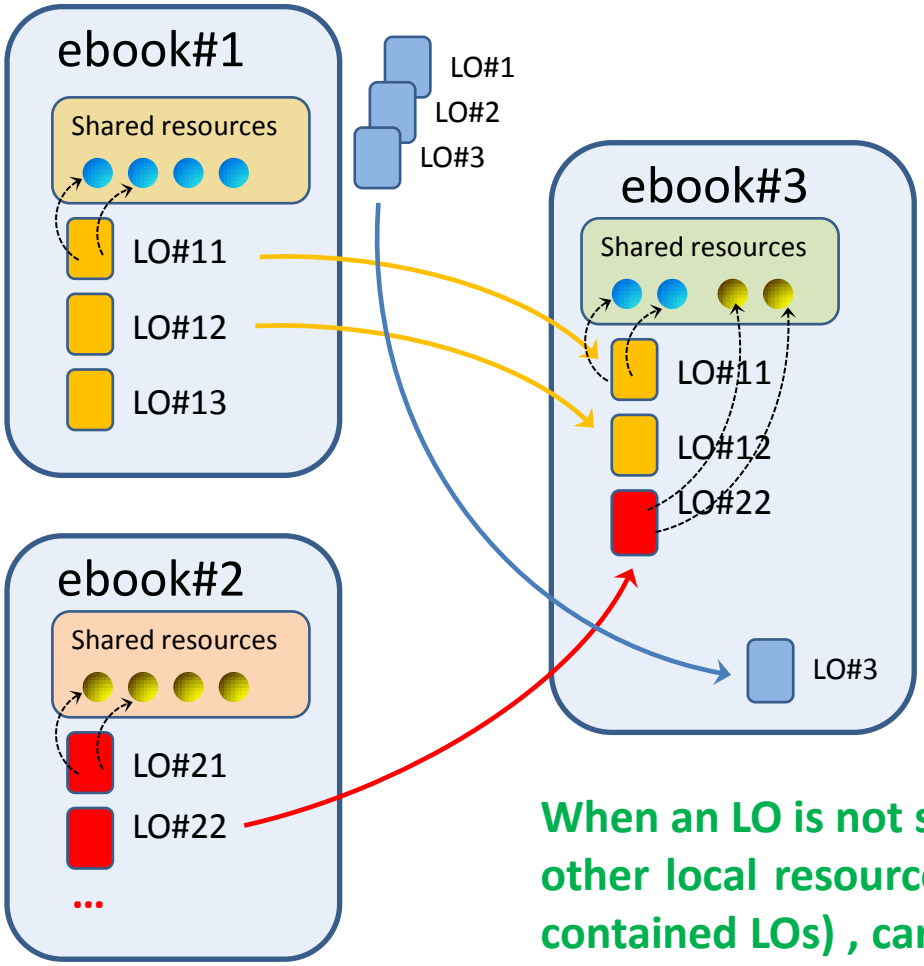
Learning objects (cont.)

- A novel implementation feature of the Hellenic Academic E-books
- Preserved within an e-book aggregator, with unique, dereferenceable URIs
- Self-contained, portable and re-usable for composing virtual e-books

- Vocabularies-Metadata: a combination of subsets fromsimple and widely used ones
  - General (dc, …)
    - creator, title, creationDate, …
  - Structural (Epub, OAI-ORE)
    - typeOf {chapter, division, table, figure, toc}, partOf-hasPart…
  - License (cc, …)
  - Bibliographic (bibo, …)
  - Scholar - learning (LOM, …)
    - prerequisites, interactivityLevel, difficulty, technicalRequirements, …
    - hasSubject {subject headings}

Reusing LO for composing new e-books



When an LO is not self-contained but refers to or uses other local resources (style-sheets, javascripts, other contained LOs) , care should be taken in order to take with it all the required resources, maintaining their relative position within the file structure.

Reusing LO for composing new e-books (cont.)

Issues to be taken care of

- In putting resources from different containers into a shared space, there might be cases of name conflicts (same name, different functionality)

Possible solution: Not use shared spaces. Isolate each LO along with its associated resources within its own micro-container

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Reusing LOs for composing new e-books (cont.)

An example from Wikipedia

Otto cycle

From Wikipedia, the free encyclopedia

See also: Otto engine and Four-stroke engine

An **Otto cycle** is an idealized thermodynamic cycle w
functioning of a typical spark ignition reciprocating pis
thermodynamic cycle most commonly found in automo

The Otto cycle is constructed out of:

Top and bottom of the loop: a pair of quasi-paralle
processes
Left and right sides of the loop: a pair of parallel is
processes

The book is a collection of relevant Wikipedia articles

Book:Thermodynamics

From Wikipedia, the free encyclopedia

This is a **Wikipedia book**, a collection of Wikipedia articles that can be easily saved, rendered electronically, and ordered as a printed book. For information and help on Wikipedia books in general, see **Help:Books** (general tips) and **WikiProject Wikipedia-Books** (questions and assistance).

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Thermodynamics [edit]

Everything you need to know [edit]

Chapter 1. Introduction
- Classical Thermodynamics
- Statistical Thermodynamics
- Chemical Thermodynamics
- Equilibrium Thermodynamics
- Non-equilibrium Thermodynamics

Chapter 2. Laws of Thermodynamics
- Zeroth
- First
- Second
- Third

Chapter 3. History

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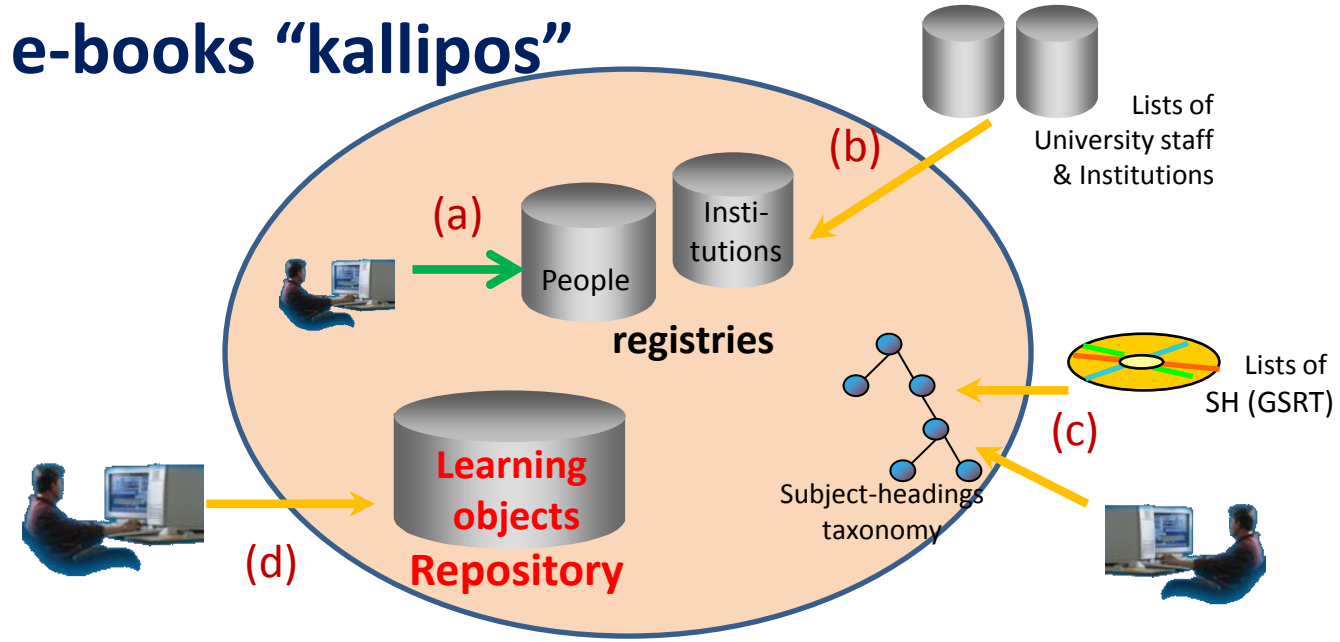
The HEAL-Link e-book aggregator



Development steps

- (a),(b) Develop-populate registries of contributors (university staff) and Institutions
- (c) Compile subject-headings taxonomies and metadata schema (healmeta)
- (d) Archive learning objects and books, with the appropriate metadata

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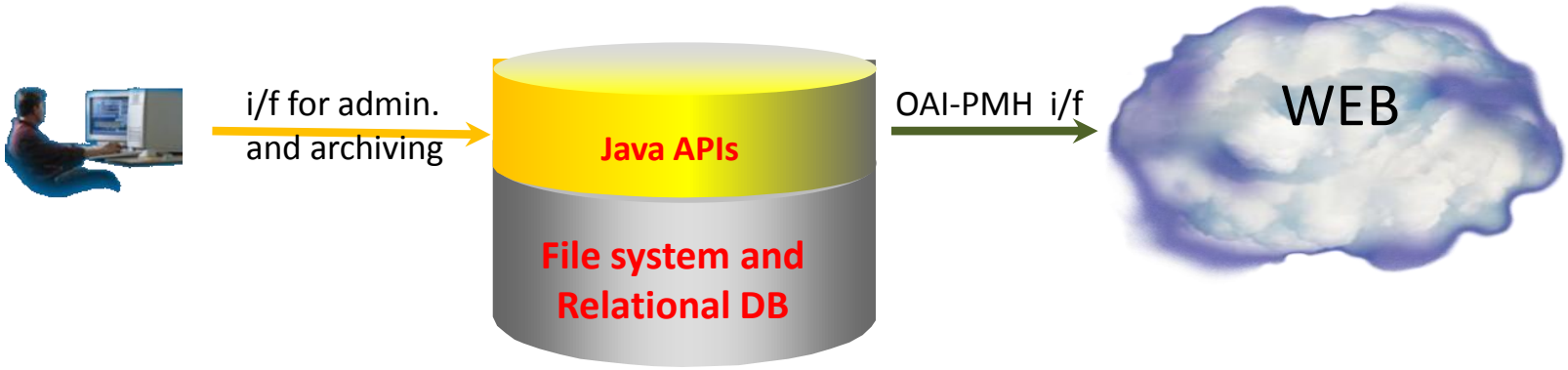
The HEAL-Link e-book aggregator (cont.)

Learning Objects Repository

- **Dspace platform**
  - Open-source software (initially by MIT and HP Labs → Dspace Foundation)
  - Content objects in a file system
  - Metadata in a relational database (Postgres)
  - OAI-PMH interface for metadata harvesting
  - Does not support the RDF model (Fedora does)
- **Same repository as for the rest of the academic content (publications, etc.) [Institutional Repository]**



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Learning objects as Linked Data

Guidelines

- ✓ **Each LO, being either within an epub container or stand alone, will be assigned a dereferencable URI**
- ✓ **The metadata (healmeta) will be mapped to elements of widely used vocabularies (dc, bibo, Dbpedia, …) to the maximum possible extent. For the rest, new concepts/properties will be devised**
- ✓ **The thematic classification schemes will be organized by means of the SKOS vocabulary and interlinked with well-known taxonomies (LCSH, DDC)**
- ✓ **Outgoing and incoming links will be developed and advertized**
- ✓ **A live extractor may be developed for extracting information from the repository about modified or newly added LOs through the OAI-PMH interface (much like the DBpedia gets information from Wikipedia)**
- ✓ **…**

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Learning objects as Linked Data (cont.)

Incoming and outgoing links

- Incoming links may refer to the Learning Objects preserved within the aggregator, like to any other content element on the web
- E-book readers, e-book composers or mashup applications will be able to discover, access and use the LOs by following these links
- Outgoing links may refer to any resource on the network
- In general, e-books are written and red as stand-alone content entities. E-readers do not require a network connection in order to present the content of an e-book. In such a connectionless mode of operation any outgoing links remain dormant; they can only be activated whenever the reader gets connected to the network
- The basic functionality and appearance of an e-book should not depend on external resources

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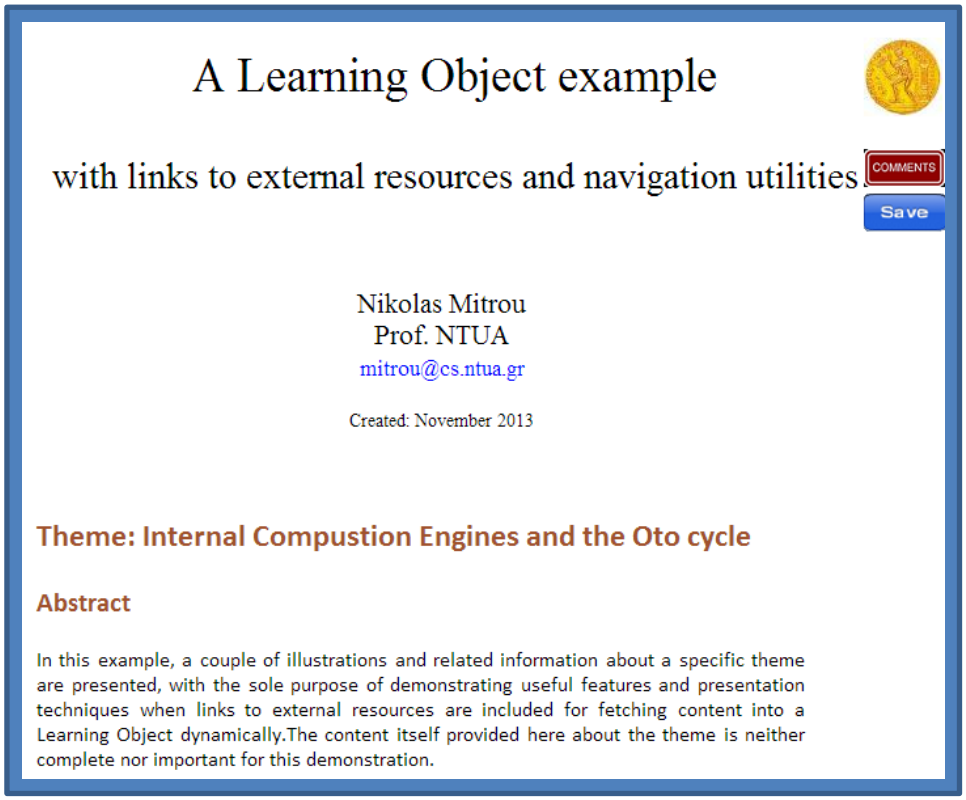
Example



- Presents two animated illustrations of the chosen theme
- Demonstrates the encapsulation of content from external resources (HTML pages or linked open data, e.g. DBpedia)
- Provides a set of navigation and comment compilation utilities
- Available by a server (as HTML) or within an epub3 container; so can be played by ordinary browsers or epub3-readers (e.g. Readium)

http://pyrros.cn.ntua.gr/epub/LO-Otto_cycle-html.html

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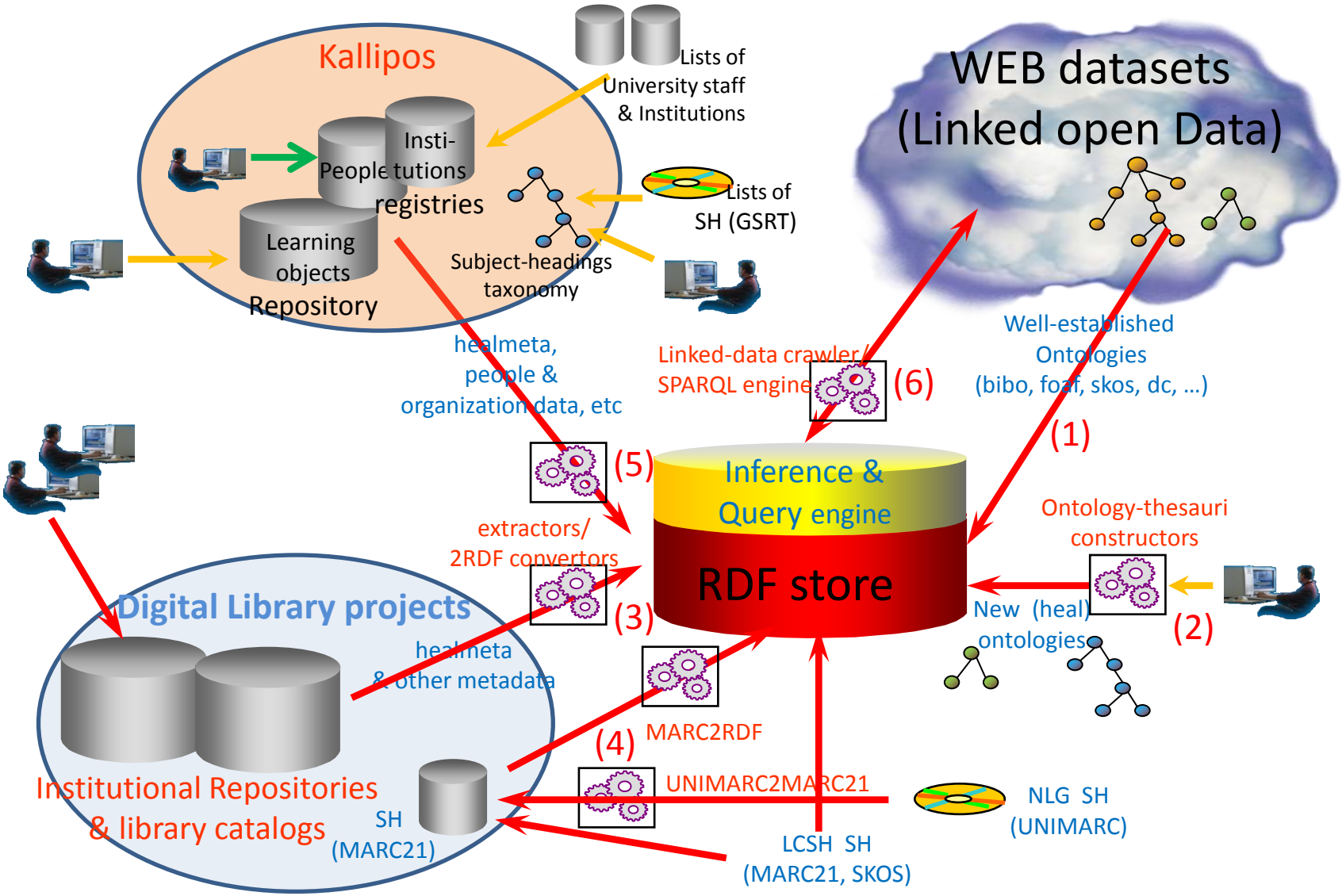
Final target: semantic integration



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Ideas for a Horizon 2020 project

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THANK YOU !