

CIDER, 2014-02-12

# Weapons of Mass Construction

## Knowledge Mapping for Collaborative Understanding

<http://conzilla.org/users/amb/projects/NSDL/layout/contextmap#-911f0e614424fcd6354fc>

You must copy-paste this Conzilla-URL into the running Conzilla program

Ambjörn Naeve

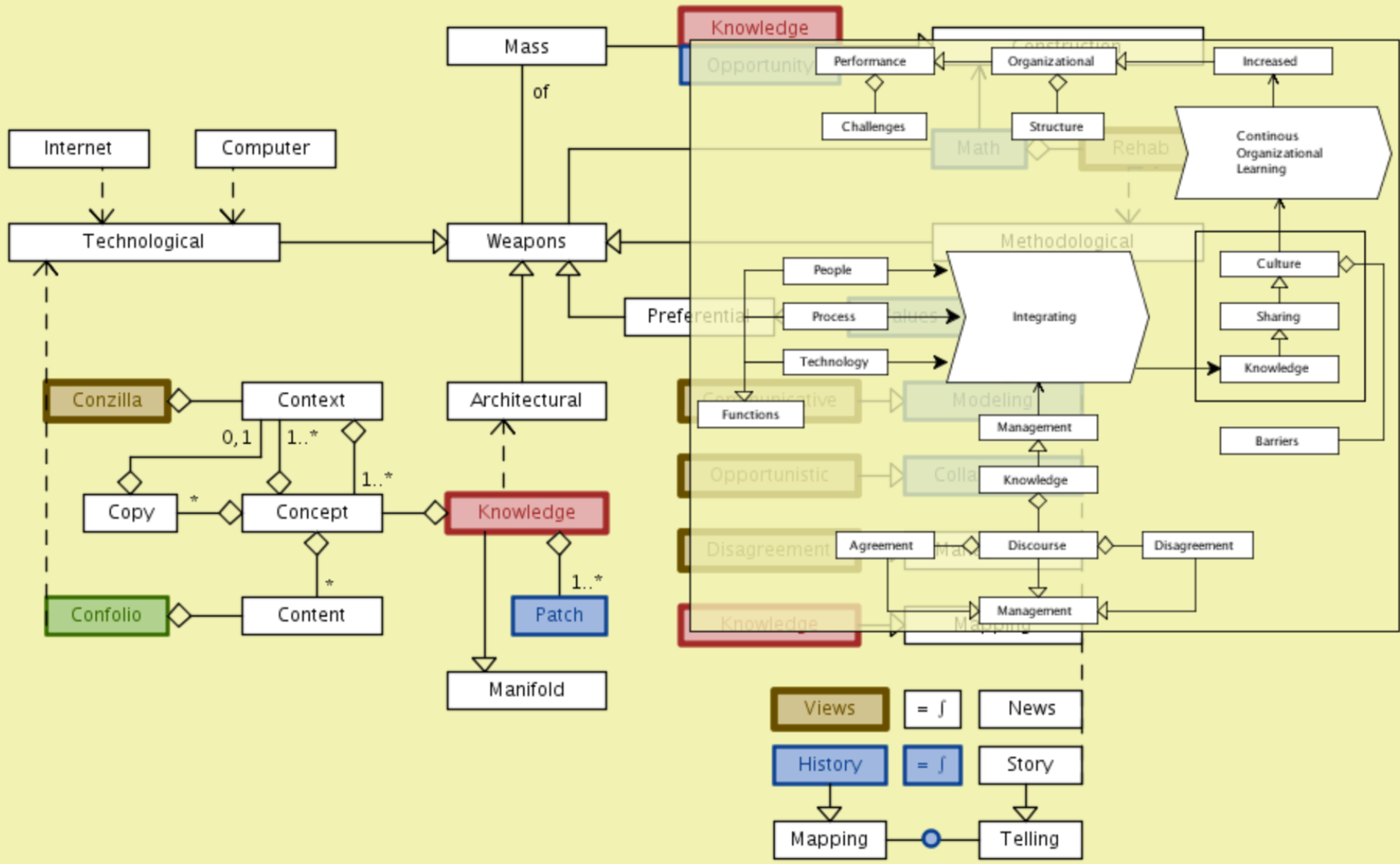
The Knowledge Management Research group  
Royal Institute of Technology (KTH)

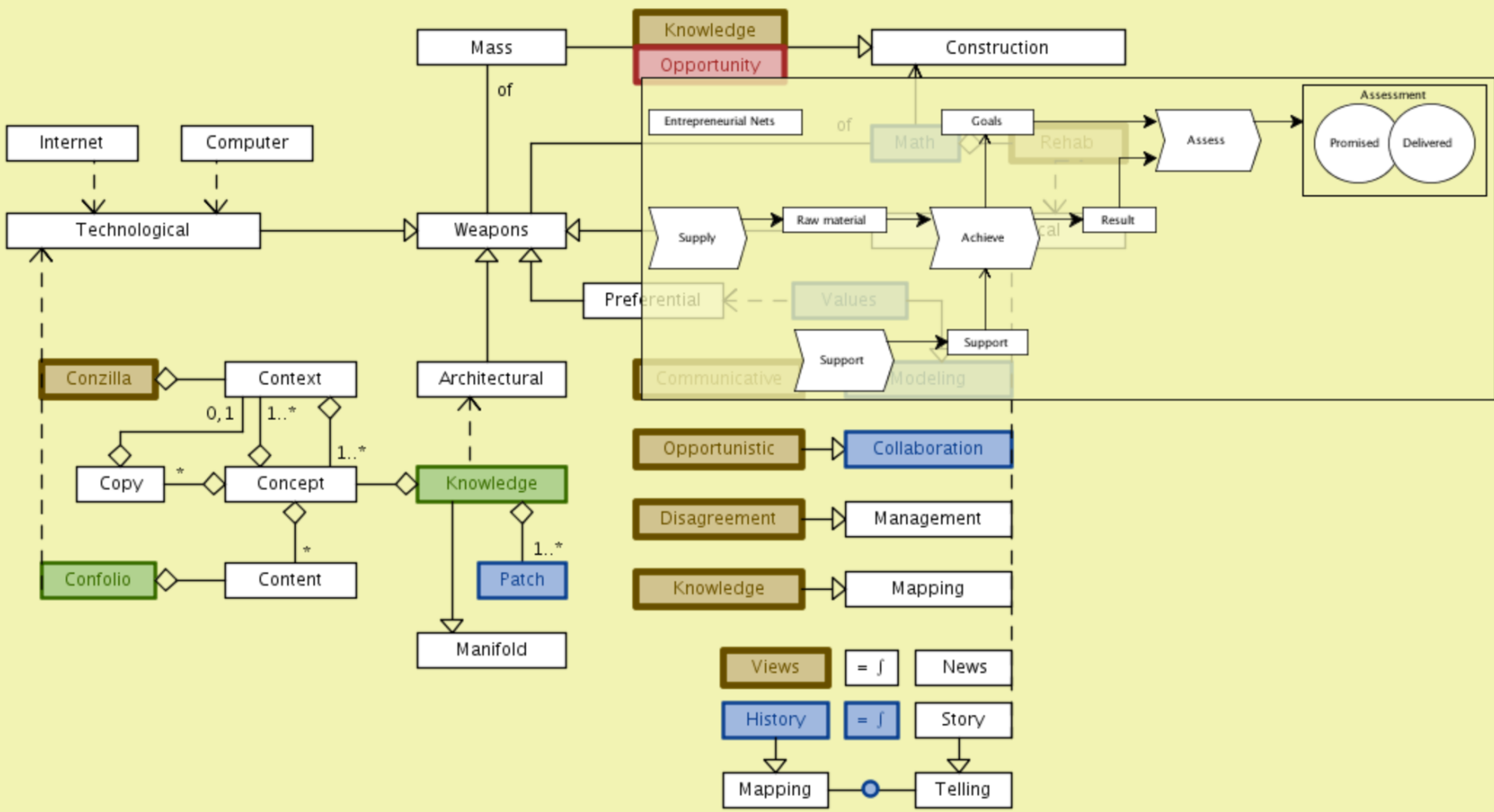
[amb@kth.se](mailto:amb@kth.se)

<http://kmr.csc.kth.se/wp>

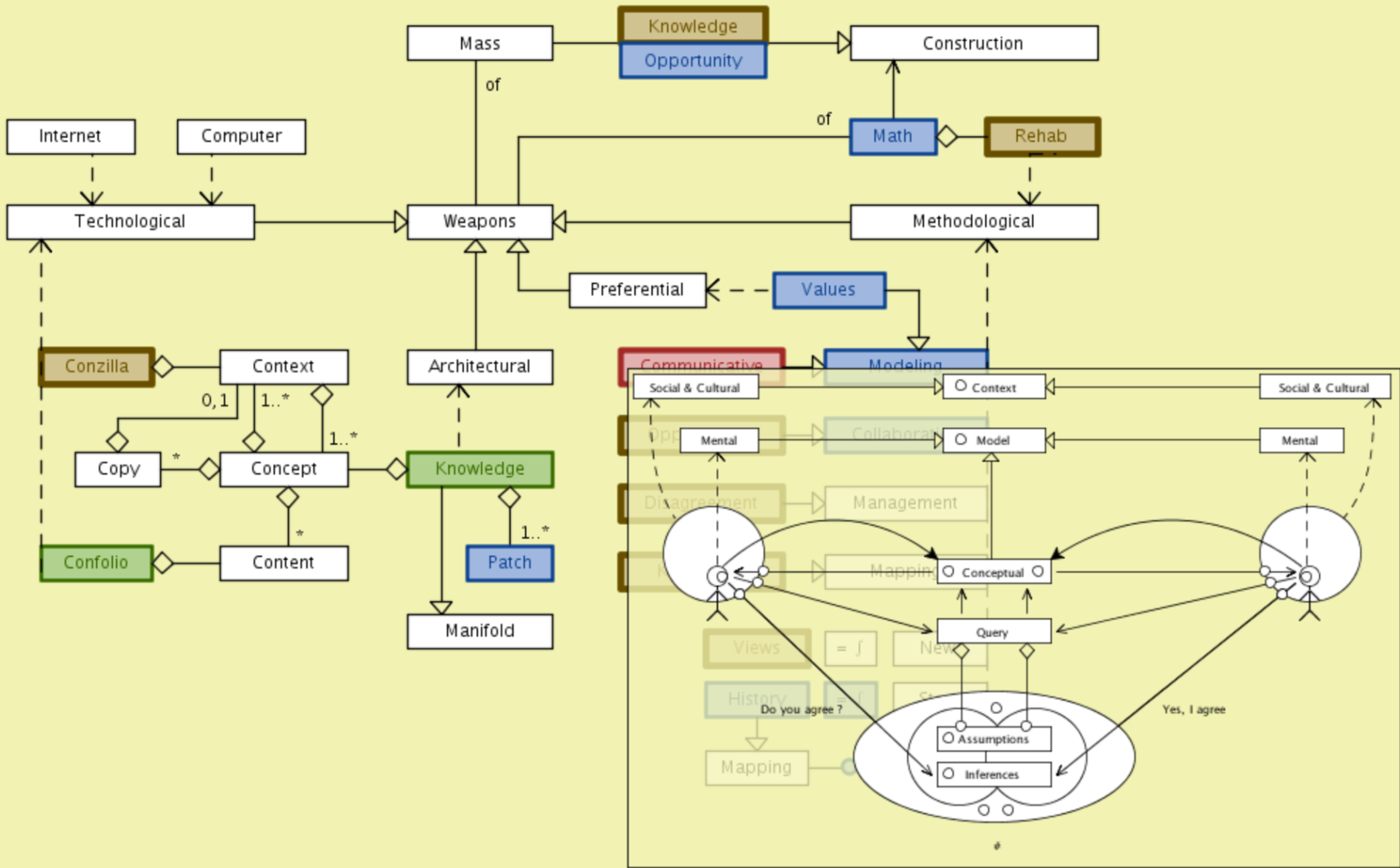




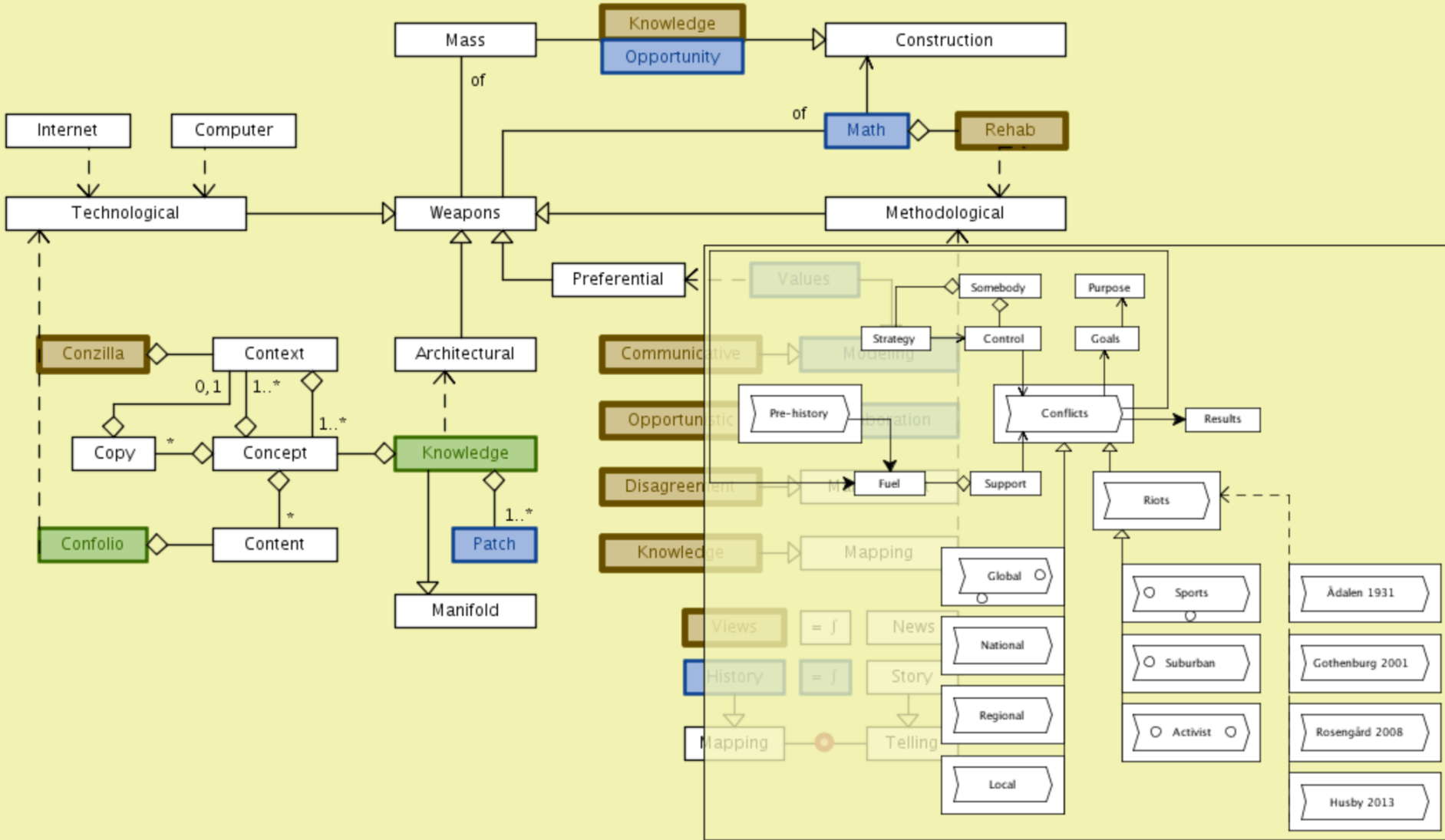


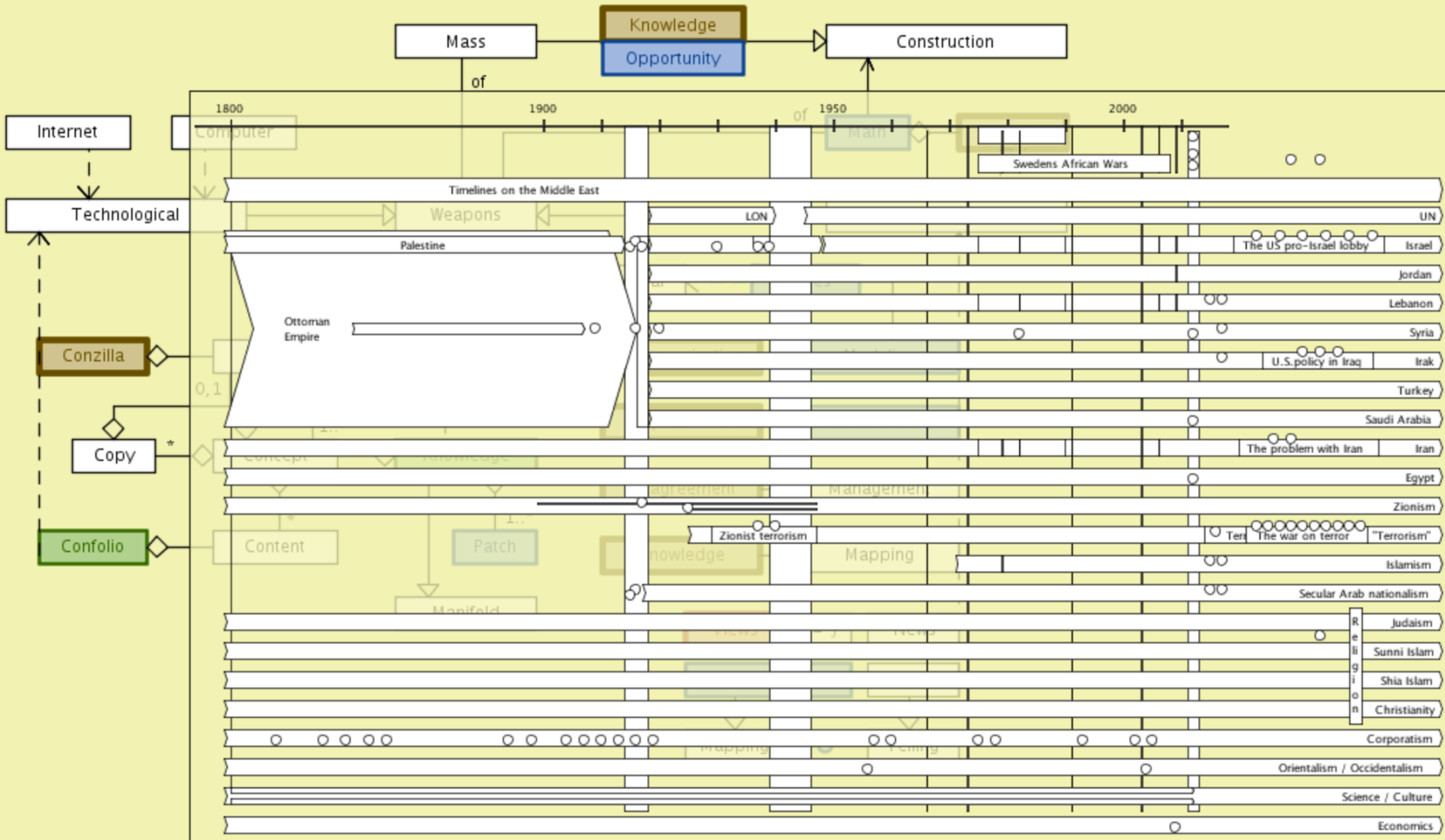


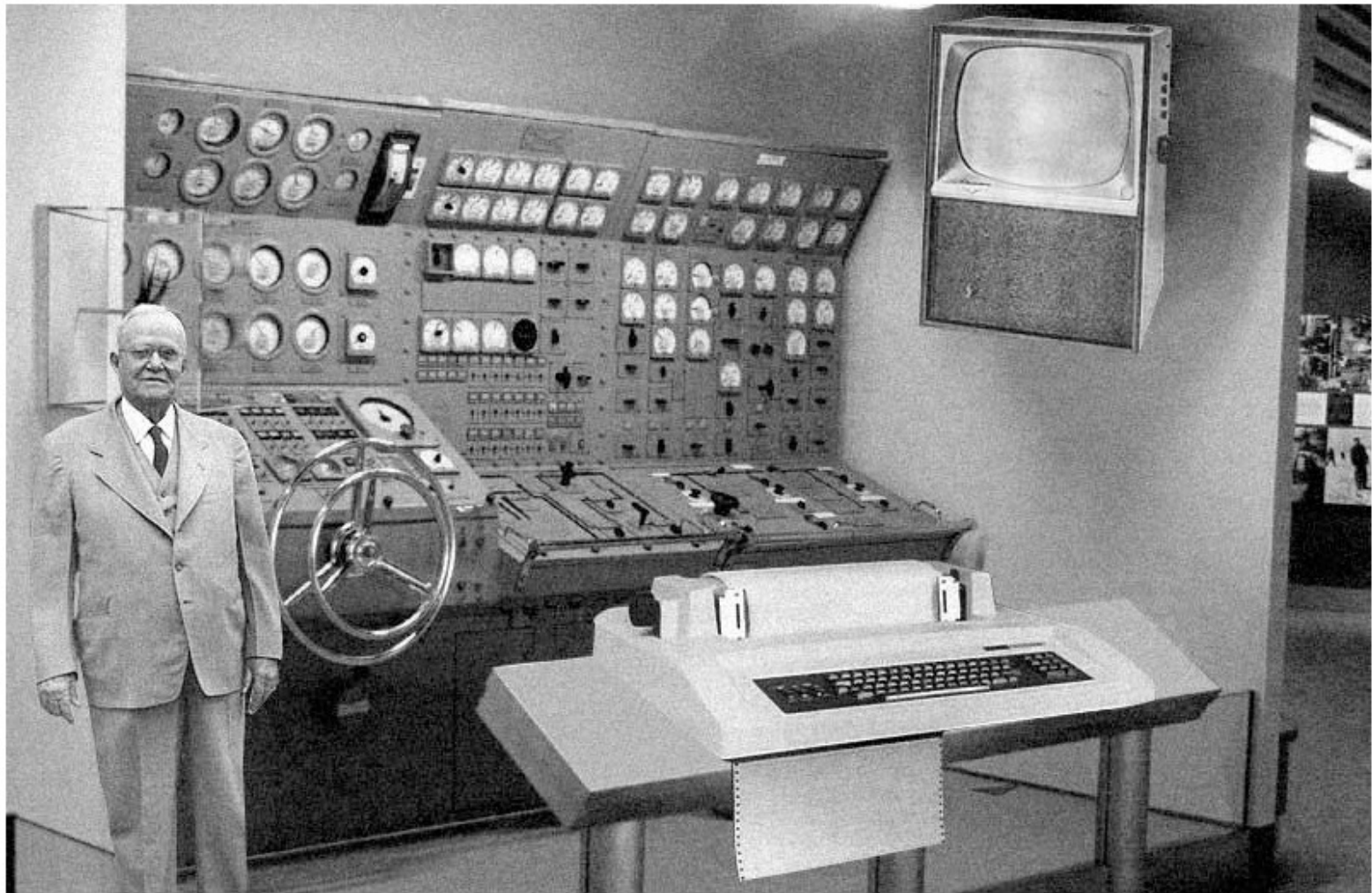






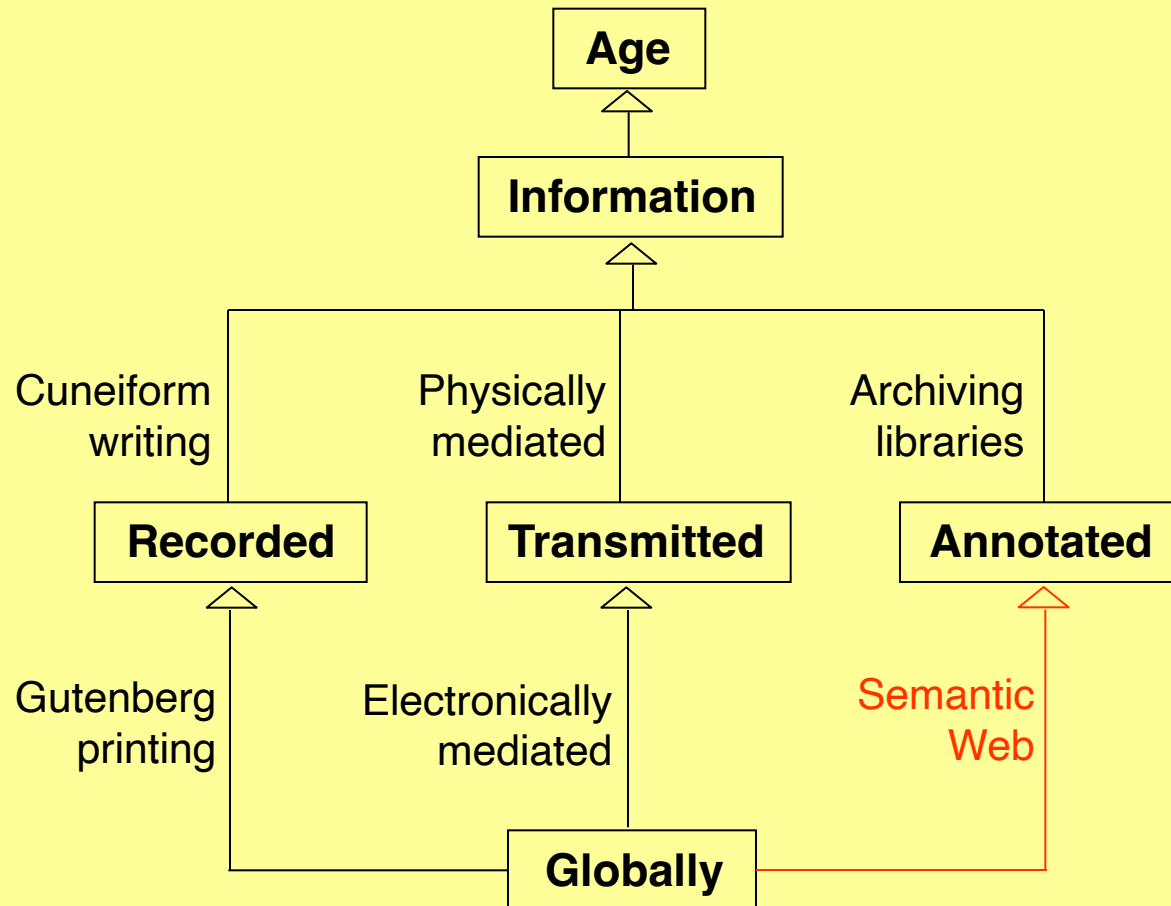




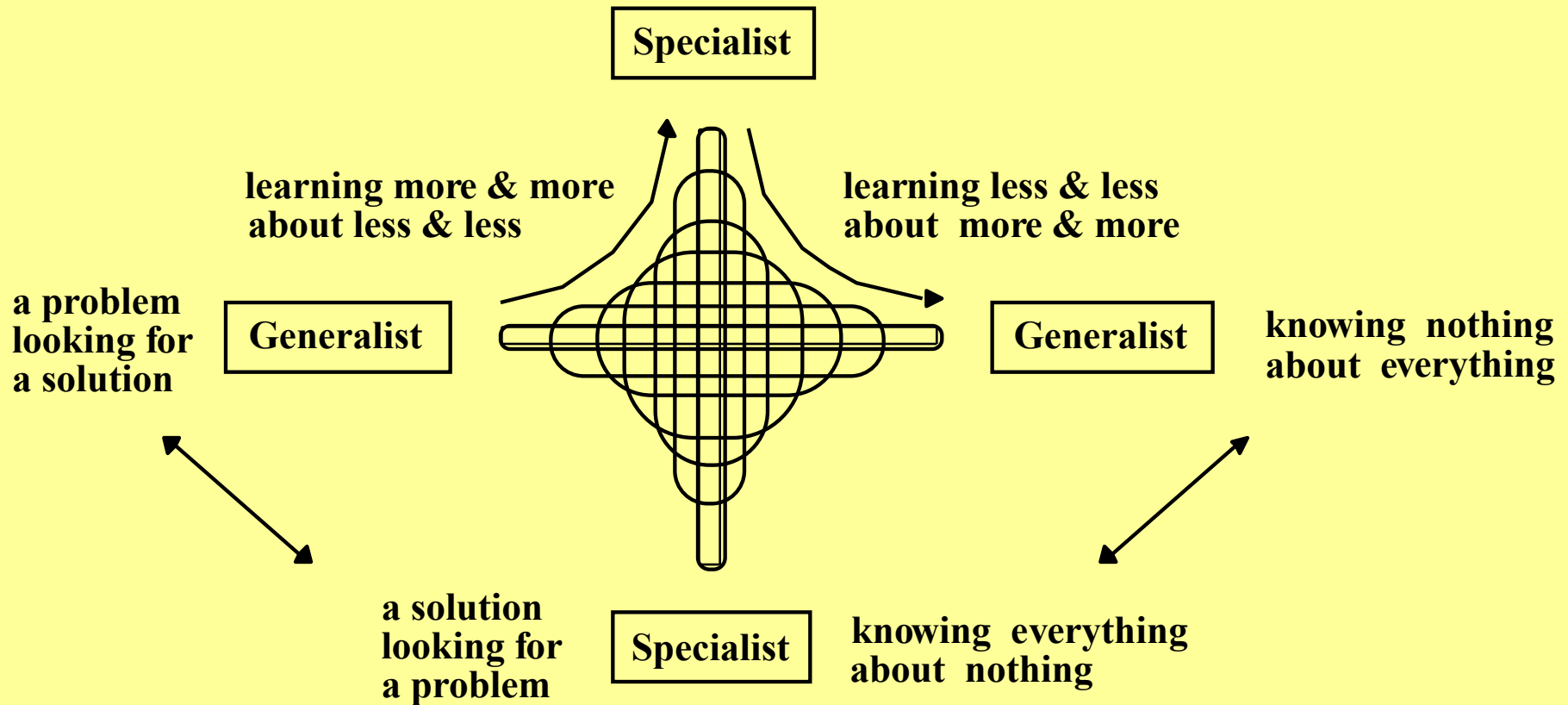


*Scientists from the RAND Corporation have created this model to illustrate how a "home computer" could look like in the year 2004. However the needed technology will not be economically feasible for the average home. Also the scientists readily admit that the computer will require not yet invented technology to actually work, but 50 years from now scientific progress is expected to solve these problems. With teletype interface and the Fortran language, the computer will be easy to use and only*

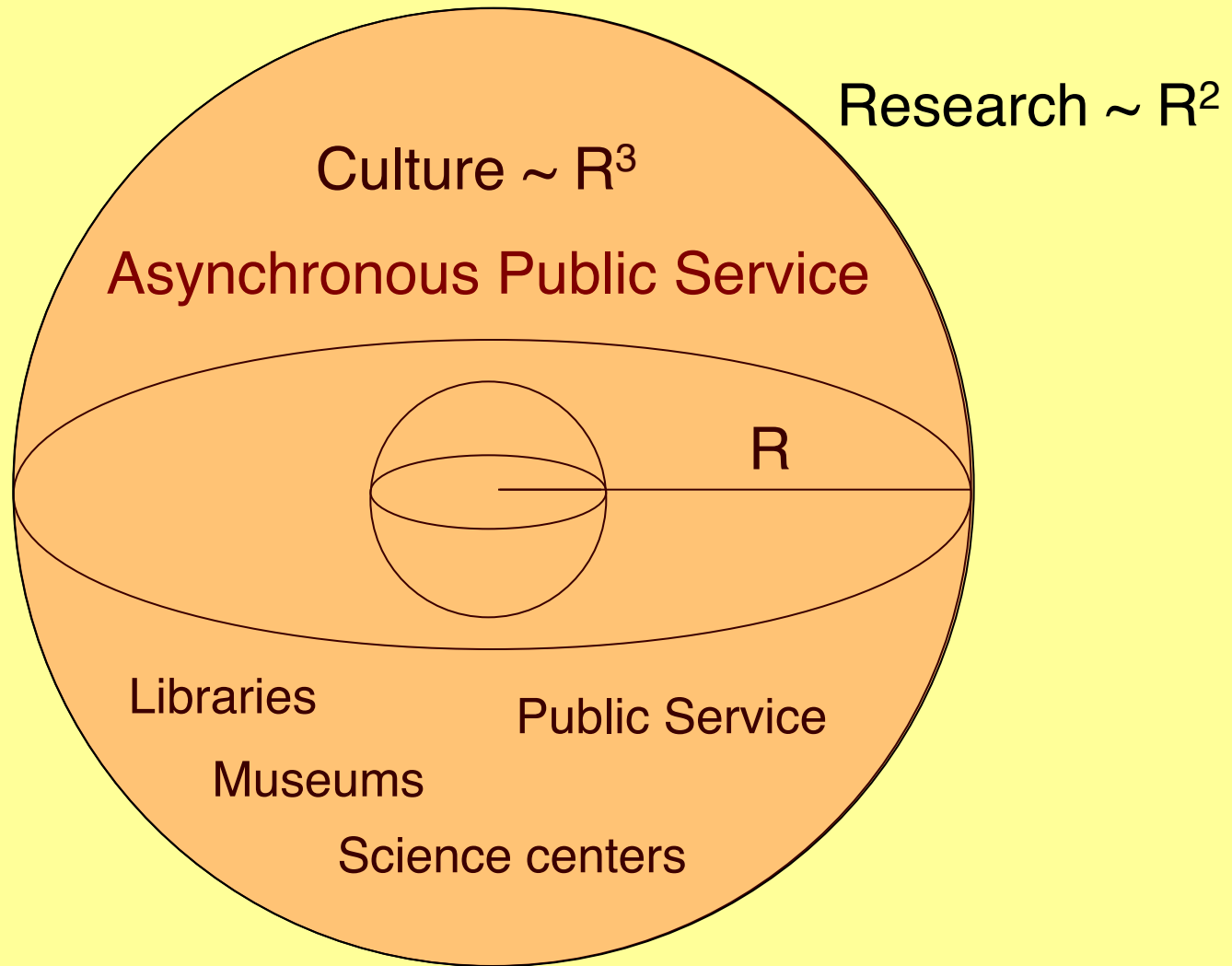
# The Globally Annotated Information Age



# The Specialist / Generalist dilemma



# The Sphere of Knowledge



# Challenges for a global knowledge community

- From knowledge philosophy to knowledge economy.
- The knowledge emulation society.
- The western self-image transformation.
- Ever decreasing attention span.
- Medial mass hysteria ("I am seen, therefore I exist").
- Globally relevant content (sustainable development).
- Increasing ethical awareness.
- Informed beggars (a TV set on top of each garbage dump).
- Anti-terrorism ("hunt 'em down and smoke 'em out").
- New technical possibilities (semantic web, p2p, ...).

# Fundamental problems within the educational systems

”Curricular-oriented knowledge push” leads to :

- lack of student interest.
- life long teaching instead of life long learning.
- lack of motivation to know why (Whitehead).
- decreasing interest in the natural sciences.

Our high-tech society is showing  
clear signs of beginning instability !

# Research areas of the KMR group

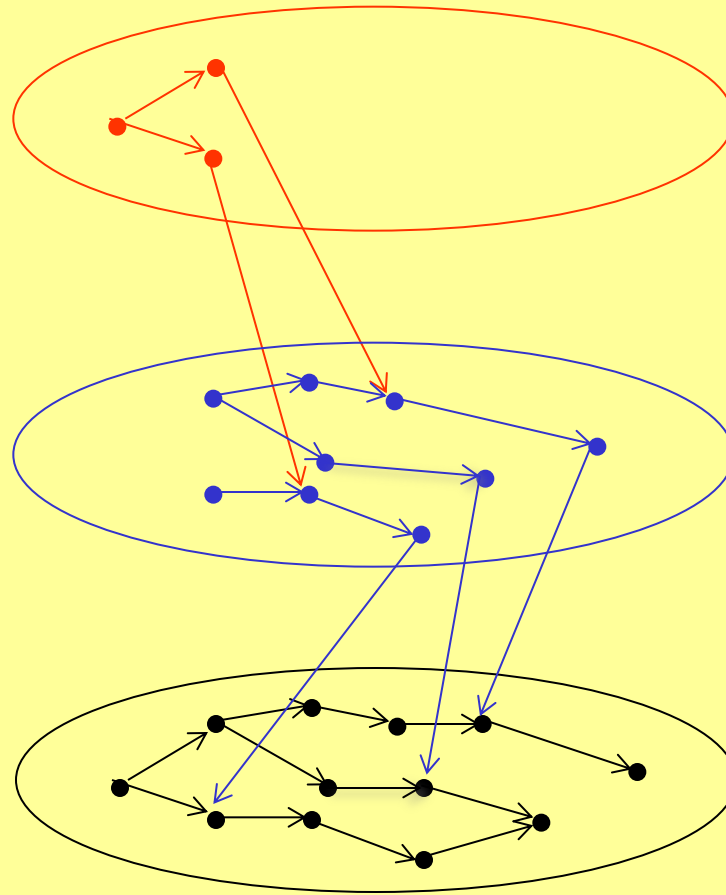
- Disagreement Management
- Ad-hoc collaboration
- Conceptual navigation (in a Knowledge Manifold)
- Frameworks for e-learning/ Semantic Web-technology
- Flexible and evolving annotations (Annotation Profiles)
- Metadata harmonization
- Semantic interoperability
- ...

# The Semantic Web information architecture

enables a shift from **knowledge push** to **knowledge pull**:

- from **teacher**-centric to **learner**-centric education.
- from **doctor**-centric to **patient**-centric health care.
- from **bureaucrat**-centric to **citizen**-centric administration.
- from **government**-centric to **citizen**-centric democracy.
- from **producer**-centric to **consumer**-centric business models.
- from opinion **registration** to opinion **publication**.

# Aim: To apply the “change-by-increment” pattern to the description of an evolving discourse



# Social Software Fills the Gap Between the Inflexible and the Chaotic

	Engineered: Inflexible Structure	Open and Free-form: Adaptive Structure	Personal: Chaotic Structure
Create	<ul style="list-style-type: none"> <li>• Rigid schemas, workflows, access rights, templates, etc.</li> <li>• Costly, infrequent changes</li> <li>• Mandated participation</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Open to participation</b></li> <li>• Open to modification</li> <li>• Reuse in context</li> <li>• <b>Visible work in progress</b></li> <li>• Incremental refinement</li> </ul>	<ul style="list-style-type: none"> <li>• Invisible work in progress</li> <li>• Invisible history</li> </ul>
Organize	<ul style="list-style-type: none"> <li>• Rigid metadata</li> <li>• Isolated repositories</li> <li>• Proprietary formats</li> <li>• Often out of date</li> </ul>	<ul style="list-style-type: none"> <li>• Organization reflects current use and needs</li> <li>• <b>Natural group formation based on activities and interests</b></li> </ul>	<ul style="list-style-type: none"> <li>• Each user reinvents his or her own structure through folders and labels</li> <li>• Largest body of information not organized</li> </ul>
Find	<ul style="list-style-type: none"> <li>• Mismatch between formal structure and use</li> <li>• Too much or too little</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Links, tags, ratings and usage determine importance and quality</b></li> <li>• Find content through people links</li> <li>• <b>Find people through content links</b></li> </ul>	<ul style="list-style-type: none"> <li>• Too much noise (duplication, version changes)</li> </ul>
Interact	<ul style="list-style-type: none"> <li>• "Cut-and-paste" reuse</li> <li>• Out-of-context views</li> </ul>	<ul style="list-style-type: none"> <li>• Dynamic profiles</li> <li>• <b>Interaction records reinforce personal and group identity, reputation and memory</b></li> <li>• Flexible feeds and alerts</li> </ul>	<ul style="list-style-type: none"> <li>• E-mail rules</li> <li>• IM rules...</li> </ul>

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Gartner

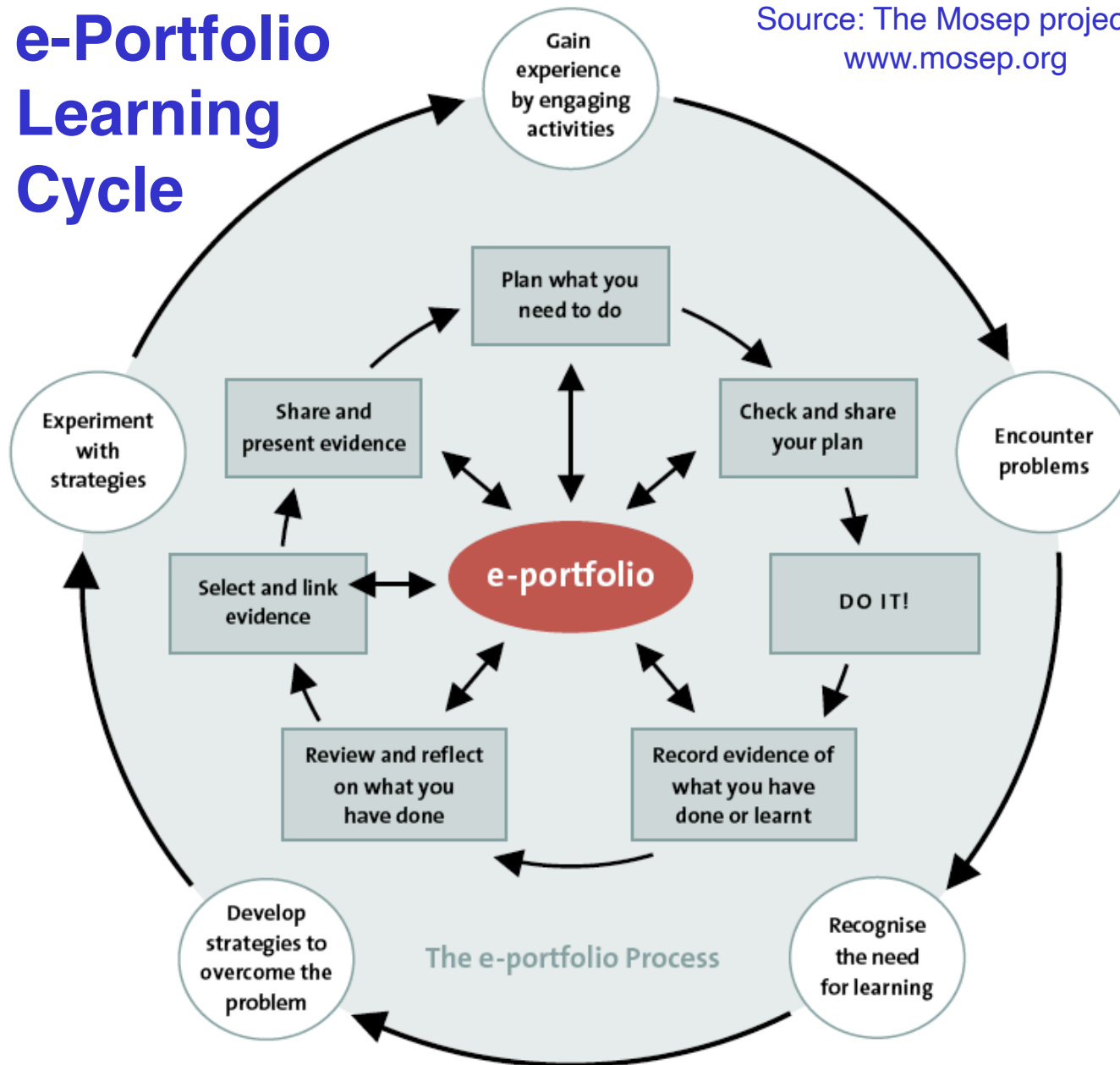
24

Gartner report 2008

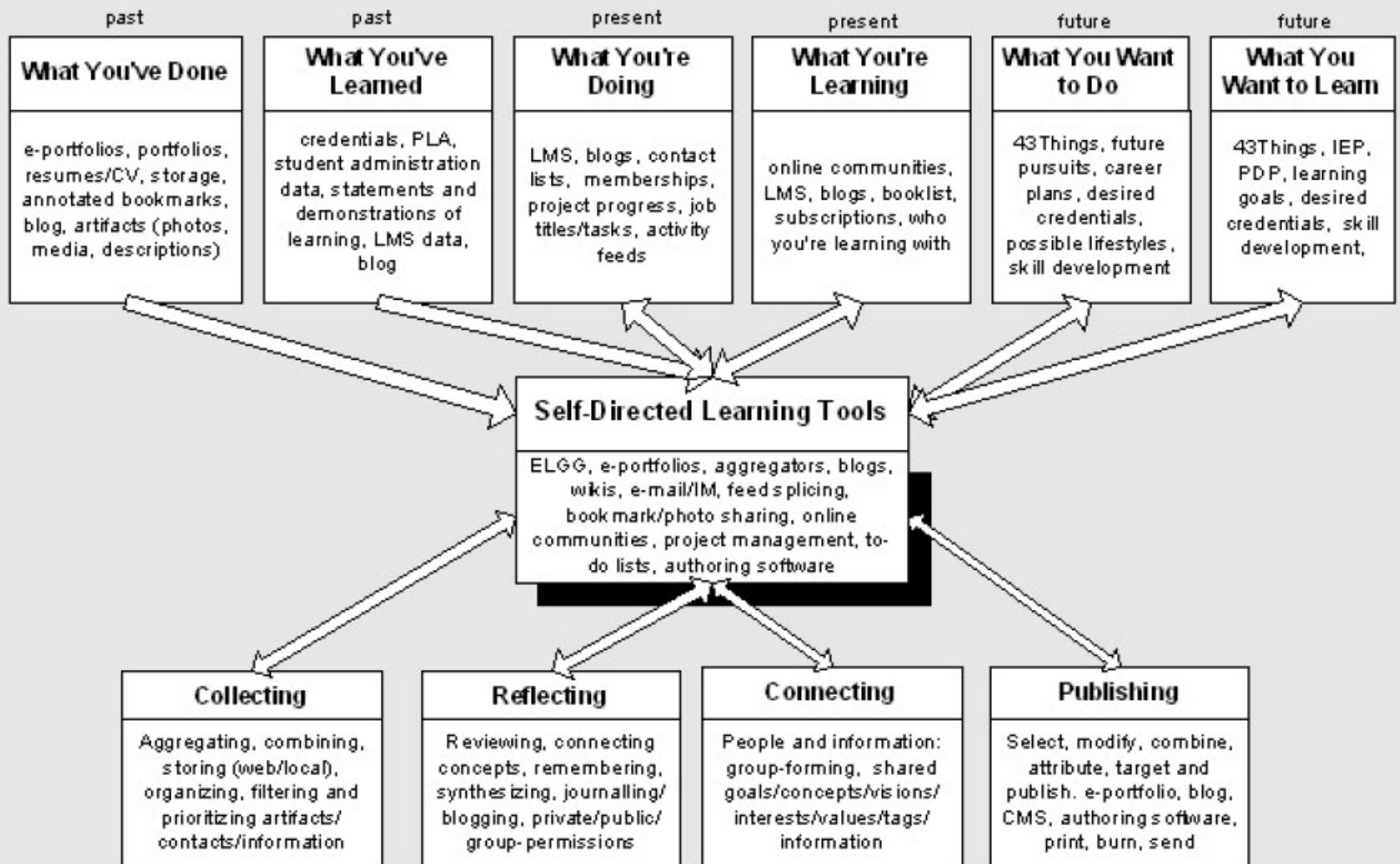
KNOWLEDGE MANAGEMENT RESEARCH GROUP

# e-Portfolio Learning Cycle

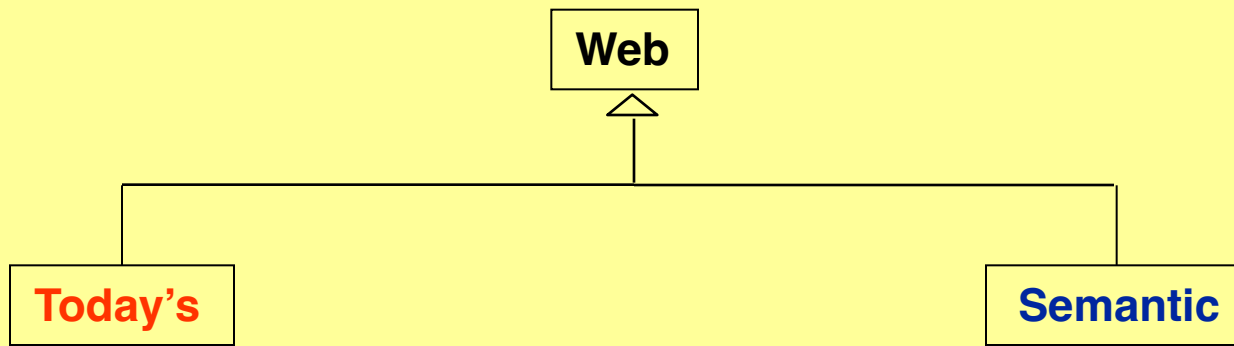
Source: The Mosep project  
[www.mosep.org](http://www.mosep.org)



Your network: contacts, collaborators, teams, teachers, mentors, colleagues, organizations, authors, friends, family, information, sources



Source: The Mosep project (Jeremy Hiebert, 2006)



- the information is distributed
- anyone can link anything to anything
- **but**
- the information about the information is
  - **document-based (XML)**
  - **centralized** (70% in data bases)
- the information about the information is
  - **graph-based (RDF)**
  - **distributed**
- anyone can express opinions about anything (via **linked data**) in a **machine-processable context**

# Semantic



## Isolation

- **XML** (used for semantics)
- **Document**-based descriptions
- **Closed** description spaces
- **Fixed** meta-data (tags & values)
- Data-bases with entry-**portals**
- No joint searching

## Co-operation

- **Ontology** management systems :
  - Manifolds / **Mappings**
  - **Contextualization**
  - **Controlled** evolution
- **Federated search** with **dynamic** queries
- **User-profiled** services

## Co-existence

- **RDF**
- **Graph**-based descriptions
- **Open** description spaces
- **Freely evolving** meta-data (tags & values)
- Data-bases with **linked-data** connections
- **Federated search** with **static** queries

# Vision/goals of Asynchronous Public Service

The technical vision is a learning web infrastructure, which will make it possible to exchange / author / annotate / organize and personalize / navigate / use / reuse modular learning objects that support a variety of courses, disciplines and organisations.

The overall aim is to produce infrastructures, architectures, frameworks and tools that will facilitate greater flexibility and functionality at all educational levels.

# KMR contributions to APS

(Asynchronous Public Service)

Tools

Frameworks

Architecture

Infrastructure

**Application  
Developers**

**End-  
Users**

**Conceptual  
Interface**

*Knowledge  
Manifold*

*Conzilla* (concept browser)  
*Confolio* (concept portfolio)  
*VWE* (component composer)

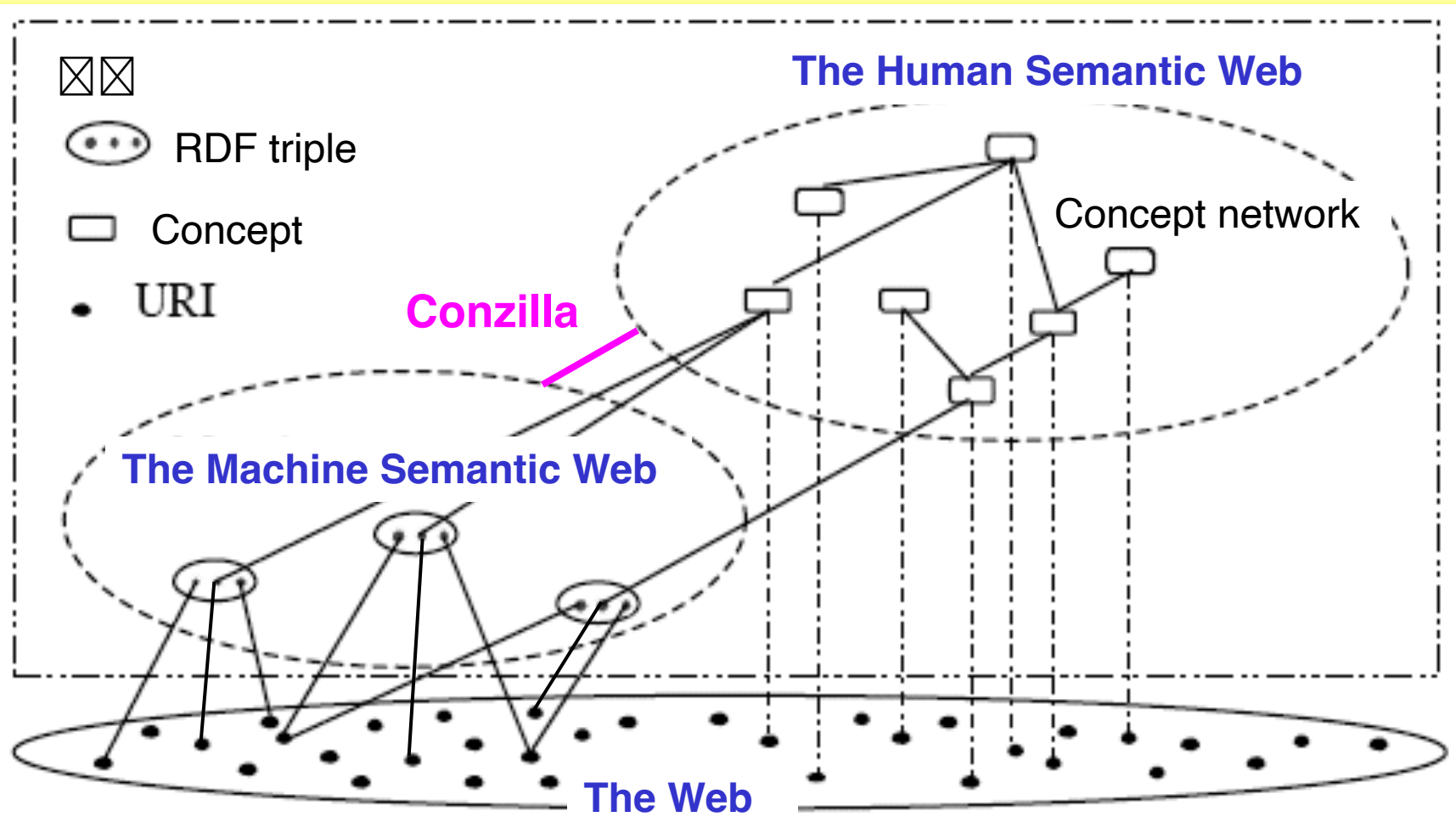
**Semantic  
Web**

*SHAME*  
*SCAM*  
*Edutella*

*Meditor* (metadata editor)  
*Formulator* (formulet editor)  
*SHAME consumer*  
*SCAM provider*



# The Human Semantic Web (“Web 4U”)



# The Knowledge Manifold architecture

A **knowledge manifold** can be described as a collection of information landscapes (**context-maps**) that are **vertically connected** by “detailed maps” attached to different concepts, and at the same time **horizontally connected** by concepts that appear in different context-maps.

All concepts and concept-relations can be “filled” (= associated) with **content** in the form of **annotated web links**.

This mixture of hierarchy and “widearchy” creates a powerful information architecture that can simultaneously **provide both overview and depth** of a knowledge domain.

# A Knowledge Manifold

- is a structured information architecture that supports a number of different strategies for information hiding.
- can be used to design learner-centric learning environments that support question-based learning.  
("knowledge-pull based on interest")
- can be considered as a patchwork of knowledge, with a number of linked knowledge patches, each with its own knowledge gardener.
- allows the user to ask questions and search for certified live knowledge sources.

# A Knowledge Manifold (cont.)

- has access to networked archives of **resource components**.
- allows teachers to **compose components** and construct tailor-made **learning modules**.
- makes use of **conceptual modeling** in order to support **separation between context and content**.
- contains a **concept browser (Conzilla)** that supports these principles and activities.

# Pedagogical foundations for a KM

- Nobody can teach you anything.  
A good teacher can **inspire** you to learn.
- Your **motivation** to learn is based on direct experience of **knowledge enthusiasm** and **positive expectations** from **live** teachers.
- The prerequisites for efficient learning are improved when you take **control** of your own **learning process**.
- No deep questions can be answered in an automated way.
- **Respect for ignorance** – which is of fundamental importance in a non-elitist knowledge society – can only be upheld if the ignorant person is **uneducated**.

# Seven different Knowledge Roles in a KM

- Knowledge **Cartographer**
  - constructs **context-maps**.
- Knowledge **Librarian**
  - fills context-maps with **content-components**.
- Knowledge **Composer**
  - combines content-components into **learning modules**.
- Knowledge **Coach**
  - cultivates **questions**.
- Knowledge **Preacher**
  - provides **live answers**.
- Knowledge **Plummer**
  - connects questions to **relevant preachers**.
- Knowledge **Mentor**
  - supplies **motivation** and supports **self reflection**.

# Our semantic "knowledge tools"

(that connect human- and machine semantics)

- **Confolio**

A personal resource- and annotation e-portfolio that supports "opinion publication" ([www.confolio.org](http://www.confolio.org))

- **Conzilla**

A concept browser for exploring the human-semantic web with machine-semantic back-end support ([www.conzilla.org](http://www.conzilla.org))

These tools are based on open source code and open ICT-standards.



# The Conzilla “Mantra”

**Content** in **Contexts** through **Concept**

**Contexts**

= **Outsides** of **Concept**

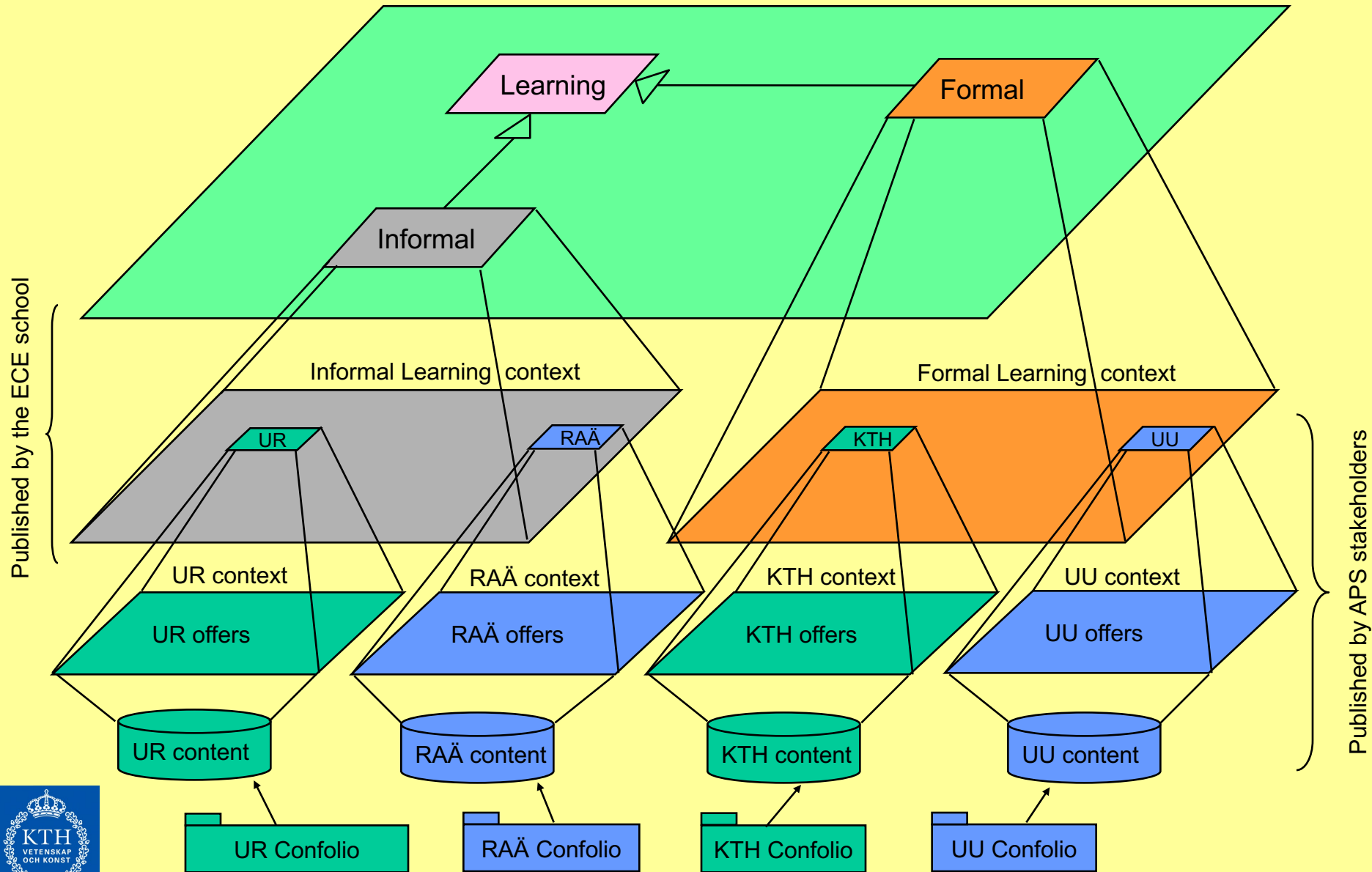
**Content**

= **Inside** of **Concept**

**Concept**

= **Border** between **these**

# Integration of Formal and Informal Learning



# Conzilla

Navigation: [www.conzilla.org](http://www.conzilla.org)

Download: <http://telmap.confolio.org/scam/4/resource/1683>

Right-clicking on a concept or concept-relation brings up a menu with three choices:

**Contexts**, **Content**, and **Information**.

- Selecting **Contexts** opens a sub-menu, which lists all the other contexts where this concept or concept-relation appears.
- Selecting **Content** opens a window (to the right) where the content-components of the concept or concept-relation are listed.
- Pointing to a **content-link** brings up information about it, and double-clicking on the content-link opens another window where the content is shown.



# The Conzilla “Mantra”

**Content** in **Contexts** through **Concepts**

**Context** = **Outside** of **Concept**

**Content** = **Inside** of **Concept**

**Concept** = **Border** between **these**

# Conzilla: Disagreement Management

by conceptual bridging

The screenshot displays the Conzilla web application interface. The top navigation bar includes 'File View Settings Go Tools Bookmarks Help' and a language dropdown set to 'English'. The address bar shows the URL: <http://www.conzilla.org/people/amb/religion/layoutCM#77e8ce1135e1e570f>.

The main content area features a conceptual map with nodes and relationships. The 'Christianity' node is highlighted with a blue oval. A red arrow points from this node to the 'Mercy' node in the adjacent text box. The 'Mercy' node is also highlighted with a red oval. Below the 'Christianity' node, a menu is open, showing options like 'Contexts', 'Content', 'Information', 'Copy', and 'Generosity'. The 'Content' option is highlighted with a red oval. A red arrow points from the 'Content' option to the 'Parable of the Good Samaritan' article in the Wikipedia browser window.

The Wikipedia browser window shows the article 'Parable of the Good Samaritan' with the following text: 'Blessed are the Merciful Roman Catholicism Charitable activities The Divine Mercy The business of giving Mercy The parable of the good Samaritan Women mistreated by Mercy Ministries'. The 'Parable of the Good Samaritan' title is highlighted with a red oval. The Wikipedia navigation menu is visible, including 'Main Page', 'Contents', 'Featured content', 'Current events', and 'Random article'.

# Conzilla: Disagreement Management

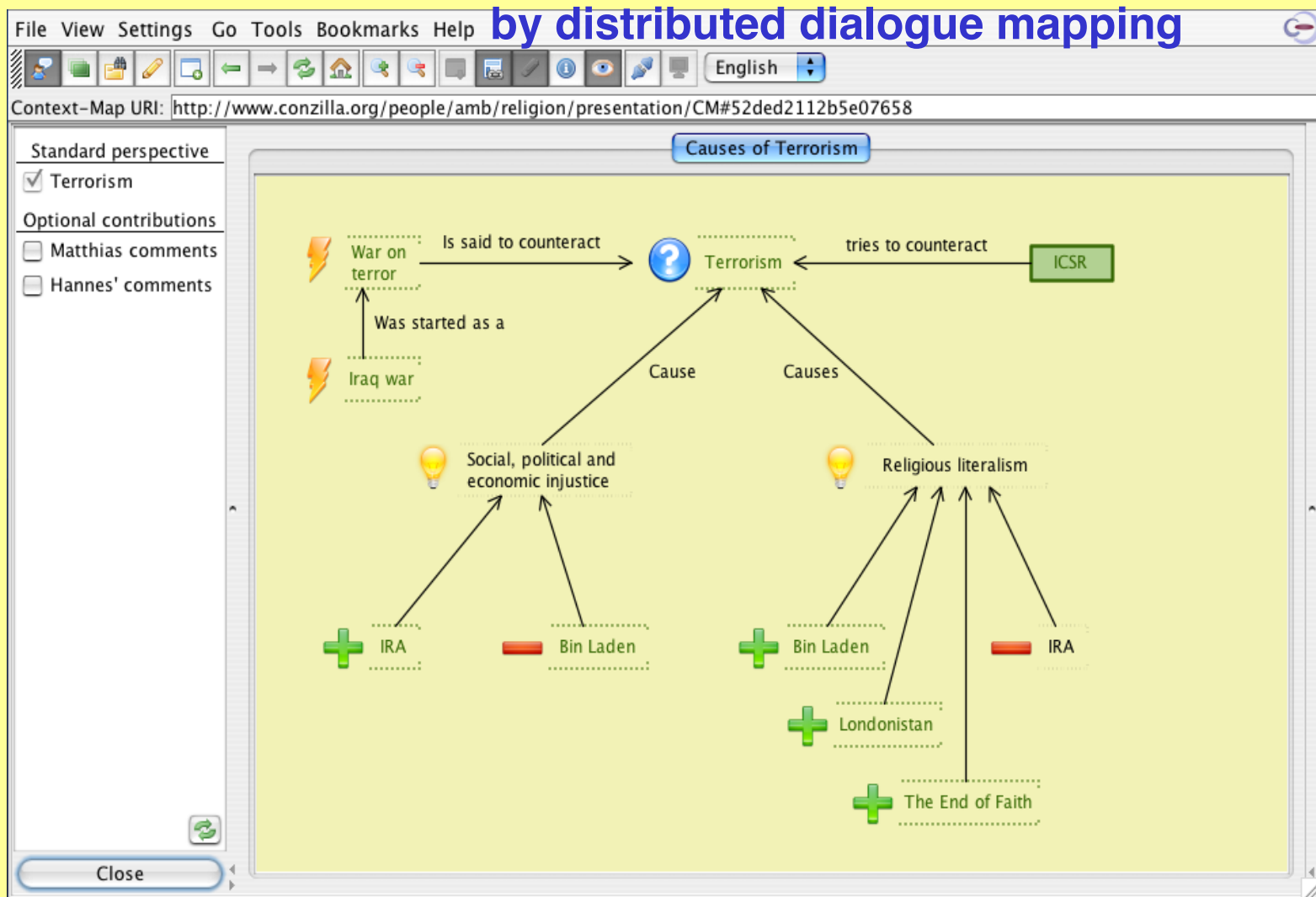
by conceptual bridging

The screenshot shows the Conzilla web application interface. The top navigation bar includes 'File View Settings Go Tools Bookmarks Help' and a language dropdown set to 'English'. The address bar shows the URL: <http://www.conzilla.org/people/amb/religion/layoutCM#77e8ce1135e1f9d29>.

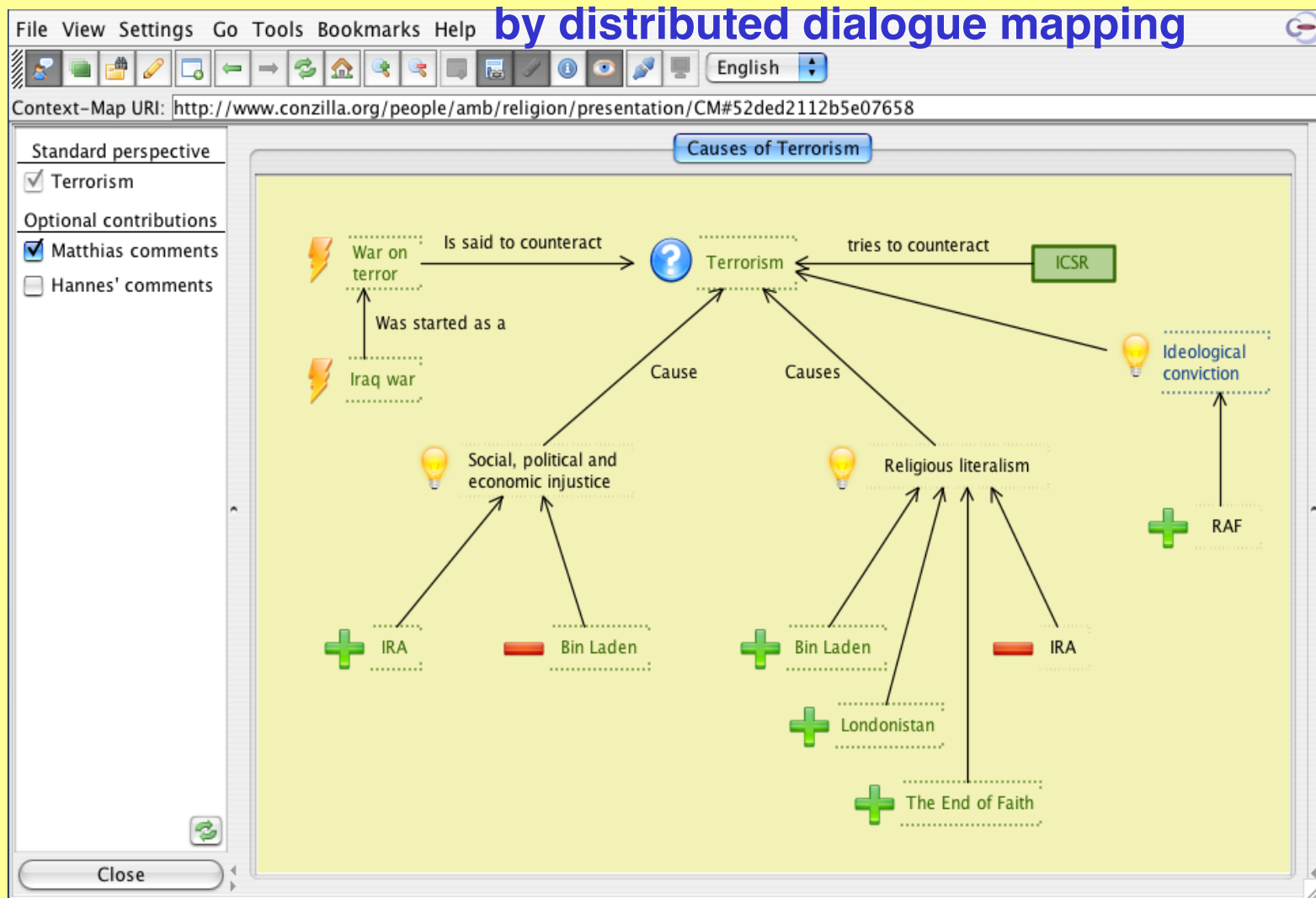
The main content area displays a conceptual map with 'Islam' at the top, circled in blue. Below it are boxes for 'Sunni', 'Shia', 'Sufi', and 'Wahabi', all pointing to 'Islam'. To the right is 'Koran'. Below 'Islam' are boxes for 'Love', 'Selfishness', 'Mercy', and 'Hate'. A context menu is open over 'Mercy', listing 'Contexts', 'Content', 'Information', 'Copy', and 'Generosity'. The 'Contexts' sub-menu is open, listing 'Buddhism', 'Christianity', 'Hinduism', 'Islam', 'Judaism', and 'Religious concepts'. 'Islam' is circled in blue in this menu. A red arrow points from the 'Mercy' box in the map to a browser window.

The browser window shows a page titled 'Mercy in Islam' by Dr. Hassan Hathout. The page content includes: 'We should not miss the total picture of Islam, the totality of Islam.', 'The total objective of the mission of the Prophet, Peace and Blessing be upon him, that was described to him by Allah, Praised and Exalted be He, in the Quran:', 'Quran 21:107 We sent thee not but as a mercy for all creatures.', and 'Therefore it is so simple to conclude that'. The browser's address bar shows <http://r>.

# Conzilla: Disagreement Management



# Conzilla: Disagreement Management



The emerging network for

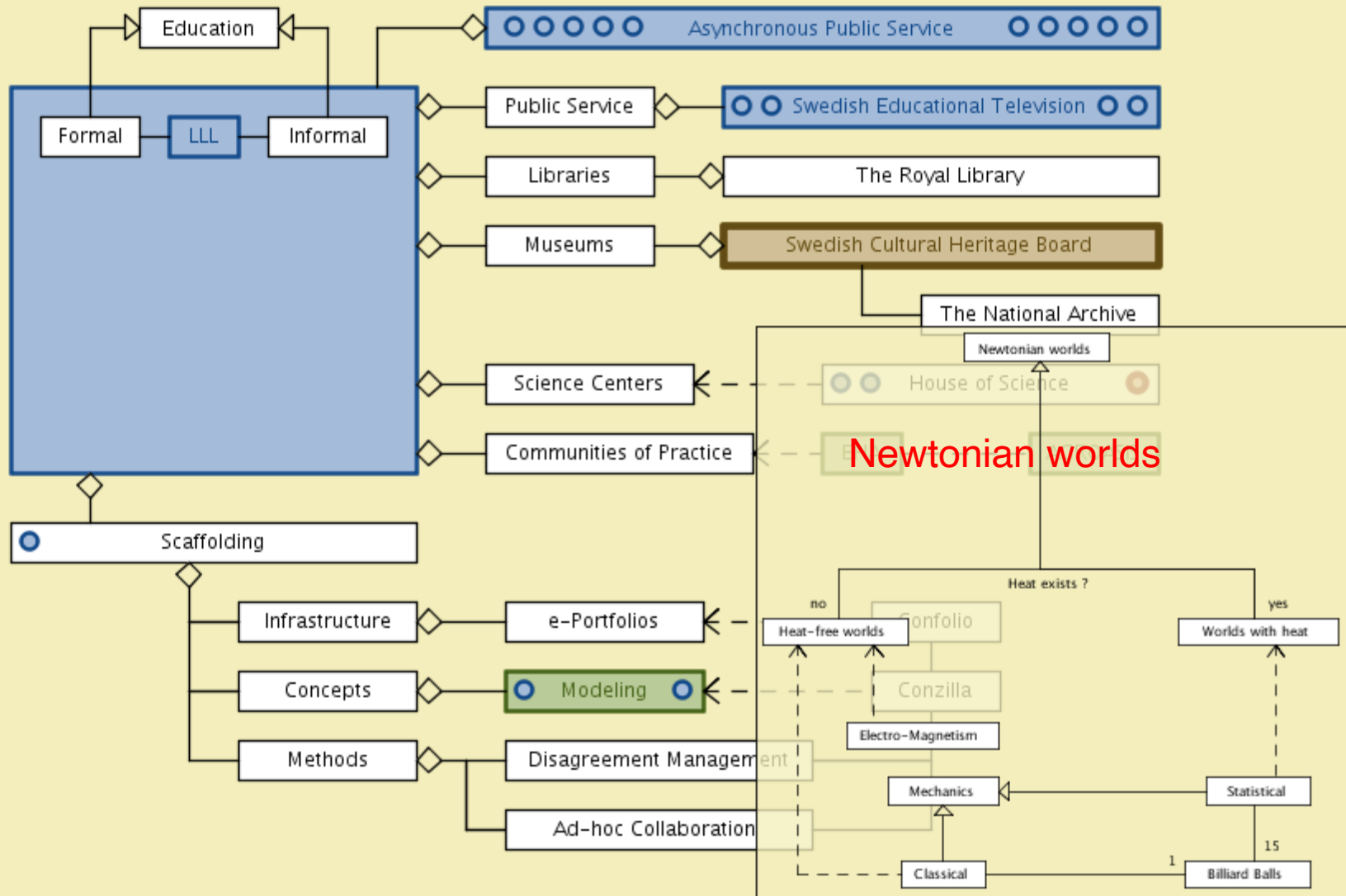
# ASYNCHRONOUS PUBLIC SERVICE

at the ECE school at KTH

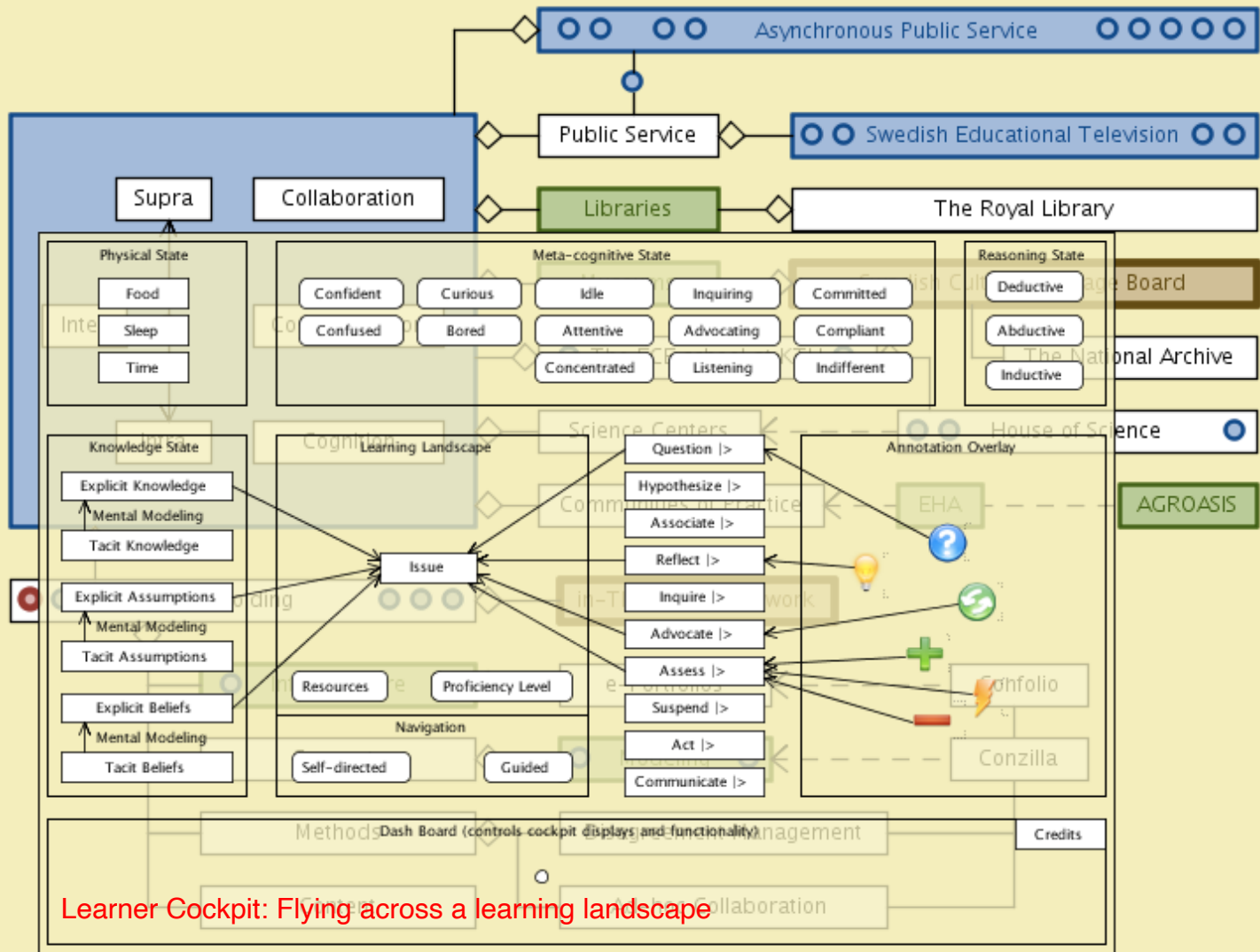


# Connecting to "Newtonian worlds"

## Asynchronous Public Service



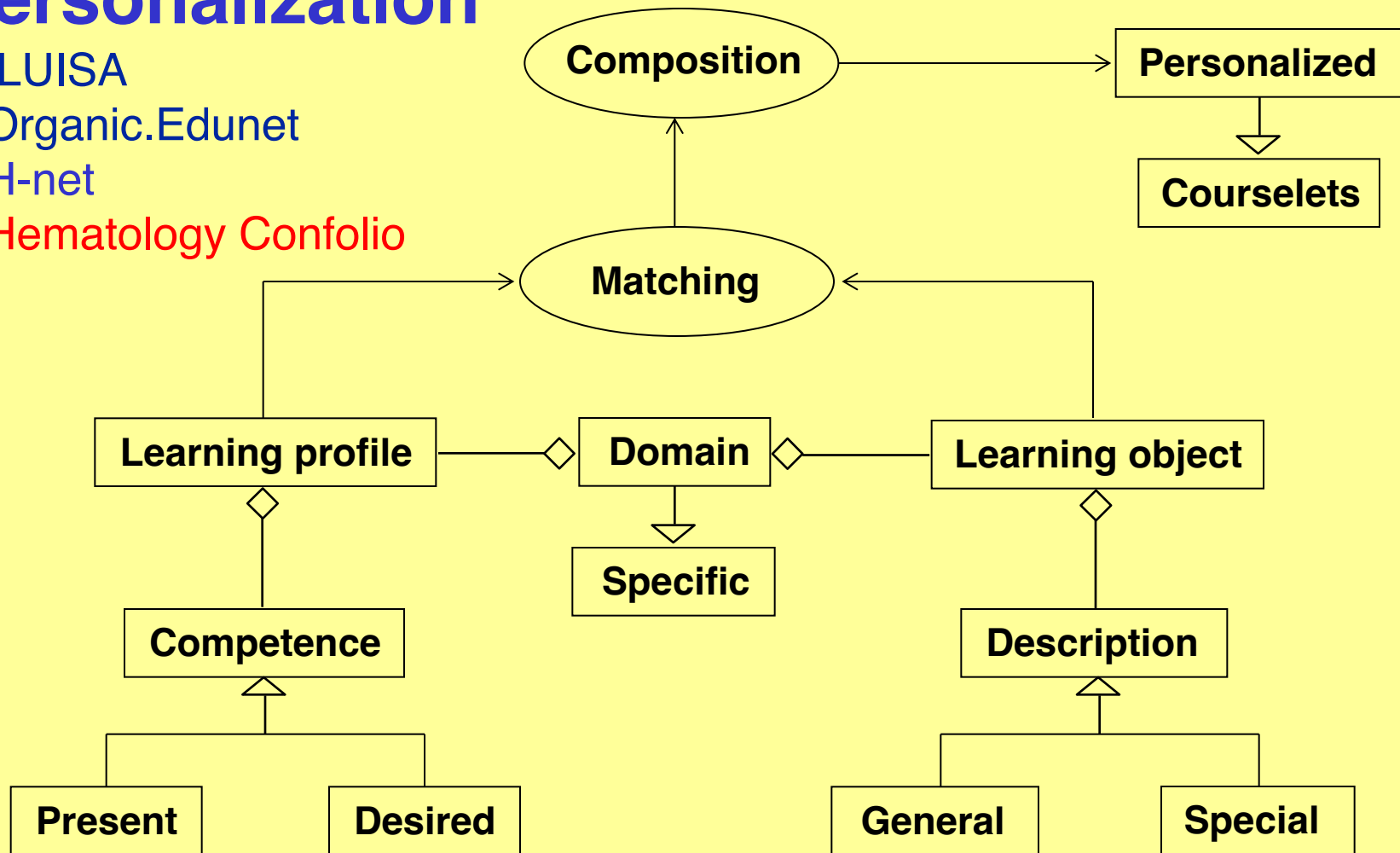
# Asynchronous Public Service



Learner Cockpit: Flying across a learning landscape

# Personalization

- LUISA
- Organic.Edunet
- H-net
- Hematology Confolio



<http://hematology.confolio.org>



# Three questions:

- 1) Given the pace of automatization in today's knowledge economy, where is the place of the average student in the workplace of tomorrow?
- 2) How can we counteract knowledge emulation and encourage intellectual curiosity and joy of exploration within the educational systems?
- 3) How can we make visible and encourage the crucial work of “curating the knowledge volume” within higher educational institutions, where presently only “penetrating the knowledge surface” counts?

# Three more questions:

- 4) How can we counteract “edutainment” (= “easy fun”) and promote the “hard fun” that leads to stories (= knowledge) with higher redundancy?
- 5) How can we counteract the increasing tendency to regard the students as “customers” of the educational systems, which builds a pressure to adjust the “product” to optimize customer satisfaction?
- 6) How can we foster “double-loop learning for sustainability” within our higher educational institutions, i.e., how can we transform them into learning organizations that help to re-orient our “global educational culture” towards building a sustainable future together?