

Depicting Educational Content Repurposing Context and Inheritance



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medical education “content”



refers to educational material

- linked with
 - specific educational objectives, learning outcomes & assessment
 - educational contexts/settings
- recommended with certain teaching methods
- ideally, with a registered history of creation and evolution

learning content in medical education



- produced by a variety of sources:
 - basic research outcome
 - accepted scientific knowledge
 - clinical practice
- addresses a variety of learning/teaching approaches, e.g.
 - conventional teaching
 - active learning experiences:
case/problem/role/inquiry/... based learning
 - ...

medical learning content types



- conventional content
 - lecture notes, books, exam questions, practicals, scientific papers, graphs, images, videos, ...
- content types unique in medical education
 - teaching files, virtual patients, evidence based medicine forms, objective standard clinical examinations, anatomical atlases, ...
- alternative educational content types
 - reflecting active learning techniques and new technologies: didactic problems, wikis, forums, web traces, ...
- user generated content
 - reflecting user interaction with learning content

content repurposing and reuse



considering the state-of-the-art nature of medical educational content, and the coverall cost to create it, it is imperative that such content can be:

- enriched
- repurposed
- re-used

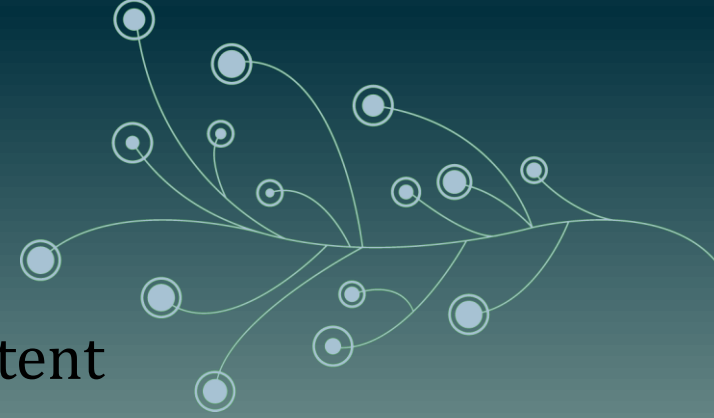
so as to be embedded effectively in medical curricula, continuing medical education and public awareness

content repurposing



changing a learning object
initially created and used for a specific
educational purpose in a specific
educational context, in order to fit a
different purpose in the same or different
educational context

content repurposing contexts



(1) repurpose in terms of the actual content

- add or mutate content of a learning object
- integrate or fuse content from different objects
- re-organize existing content

(2) repurpose to different languages

- crucial as medical knowledge has to be conveyed to the public as well

(3) repurpose to different cultures

- mainly account for different legislation, medical regulations, lab test norms, reference values, units, requirements for different groups

content repurposing types



- (4) repurpose for different pedagogical approaches:
- from conventional lecturing to active experiential learning (and vice-versa)
- (5) repurpose for different educational levels:
- to match different prerequisites for undergraduate, postgraduate, residents, specialists, life-long professional training, public awareness
- (6) repurpose for different disciplines and professions
- ranging from medicine, and nursing to lab technicians, basic life sciences, to bioengineering and informatics, and even to healthcare administrators etc.

content repurposing types



(7) repurpose to different content types:

- change a learning object from one type to another

(8) repurpose for different technology:

- digital format, digital size and quality, metadata description scheme, computer platform, etc

(9) repurpose content created for a different purpose to content used for education

(10) repurpose for people with special needs

why bother with studying repurposing



- automatically repurpose educational content
- keep track of a learning object evolution
 - credentials to contributing individuals
 - IPR issues
 - update a learning object (or a fragment of it)
- a different view in learning objects search and retrieval:
 - via associations created during repurposing

Web 2.0



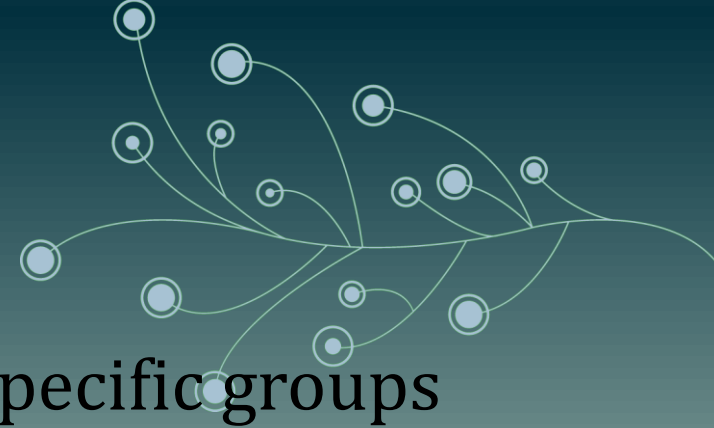
among other things

peer-to-peer collaboration, participation,
re-use, sharing ...

- sharing resources
- sharing knowledge
- sharing opinions

- creating SOCIAL NETWORKS

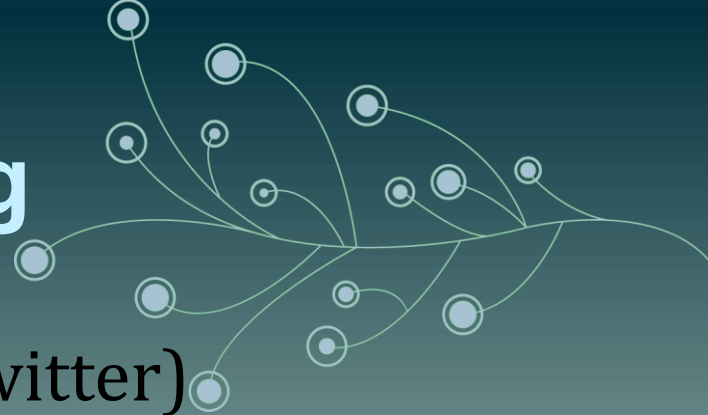
online social networking



online grouping of individuals in specific groups

- via social web sites
 - individuals can see others' profile, share interests, communicate, interact
 - individuals interconnect via common interests and declared relationships
- dynamic evolution of the community
- emergent, user generated organization, as opposed to predefined structure
- examples: facebook, delicious, biomedexperts ...

online social networking



- general category (Facebook , Twitter)
- similar interests (Myspace for music enthusiasts, aNobii for book lovers, Epernicus and SciSpace for scientists and technology followers)
- similar ethnic background (BlackPlanet for African-Americans , Odnoklassniki for Russian and Zoo for greek users)

!!! Google's new Social Search is a good example of how much social networks is a part of our every day internet life.

an educational content repurposing social network



basically 2 social networks intertwined

- one formed by actual people (authors, teachers, students, end users)
- one formed by content items

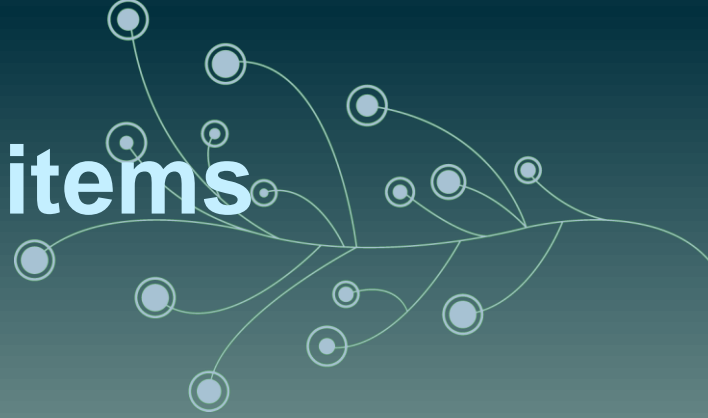
with rich interactions within each network
and across the two networks

interactivity for humans



- declaration of “friends”
- personal blogs
- personal content libraries
- creation of groups
- private and group messaging
- ...

interactivity for content items



- via (author defined) tags
- via comments and blogging
- via repurposing history

use the

“I am a friend of” and “my friend is”
relationships of a social network to describe
“repurposed from” and “repurposed to”

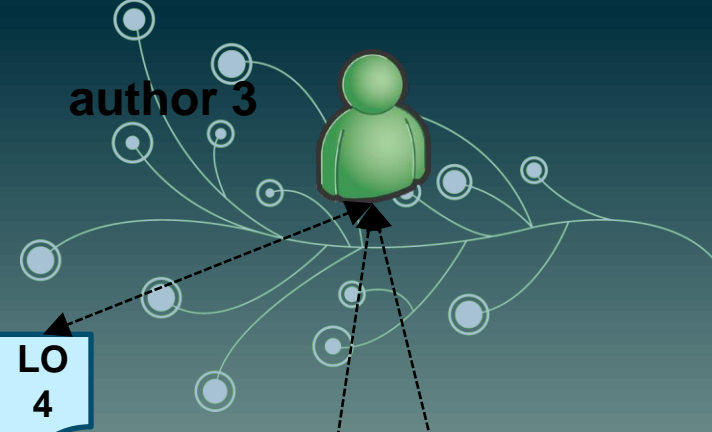
author 1



author 2



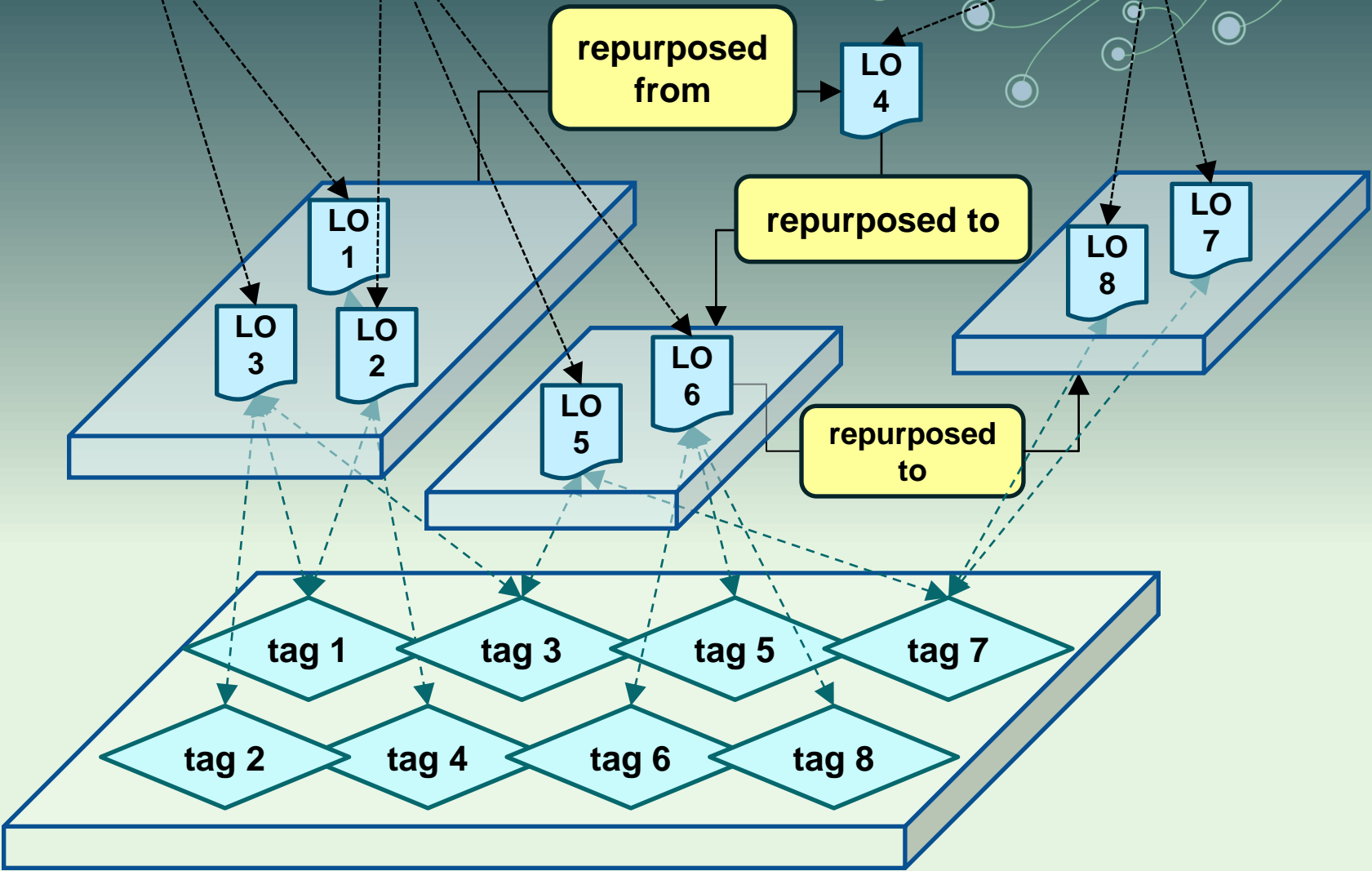
author 3



repurposed from

repurposed to

repurposed to



the implementation

based on the ELGG
open source social
network platform
modified for the
incorporation of the
second network of
learning objects



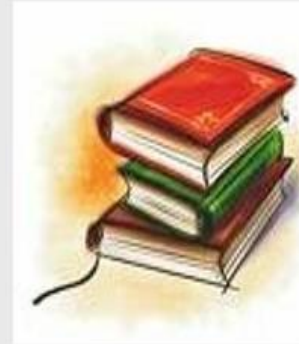
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0066: System Security

Identifier: L00066

Author Surname: Dovroliis

Author Name: Nikolas

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Institute: School of Medicine, Democritus
University of Thrace

Country: Greece

Object Title: Ασφάλεια Συστημάτων

Date: 03-06-2008

Keywords: Computer Systems, Security,
Firewalls, Virii, Computer Threats

Language: greek

Description:

These are the notes used to teach a course on
Computer System Security.

Type: lecture

User Role: Teacher, author, learner

Audience Level: undergraduate, postgraduate

Audience Profession: information scientist,
computer technician, general public

Audience Culture: n/a

Copyright: free for educational purposes

the ELGG platform



<http://elgg.org/>

- open source social network platform
- allows creation of ones' own social network
- features plug-in architecture
- supports a number of open standards (RSS, LDAP, OpenID, FOAF, and XML-RPC)
- technical features: Apache web server, MySQL and PHP

the “Social Graph”



social networks can be represented with graphs

- graphs depict both the entities of a network in the form of nodes and the relationships between those entities in the form of edges.
- graph metrics can be applied to this visual representation: e.g. centrality, density, radiality, ...

the “Social Graph”

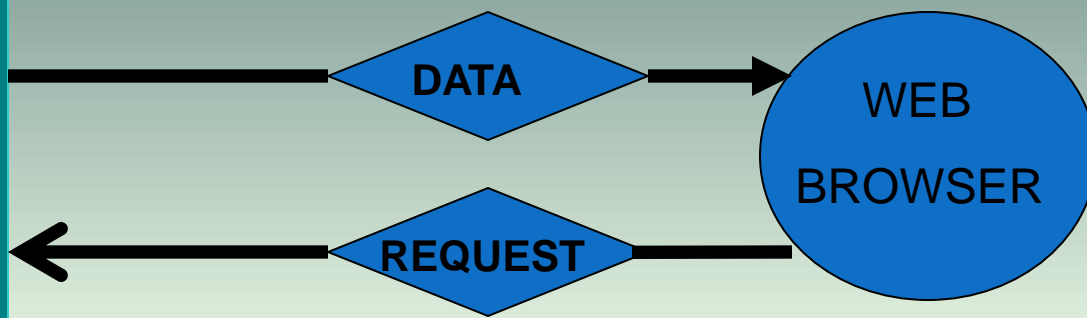
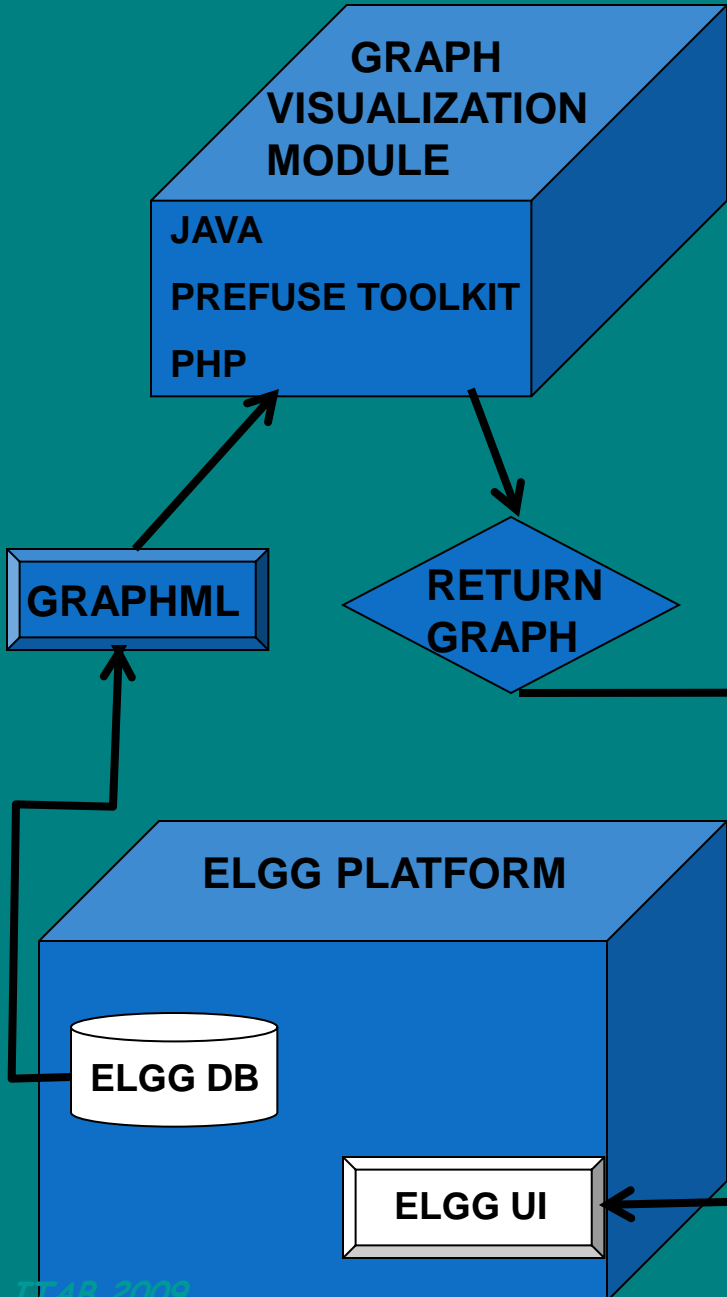


current state

- various applications for different social networks both for leisure usage and scientific analysis
- e.g. “The Nexus” (for facebook users to find people they may know), “Social Action” (for studying the voting patterns of US senators or the Al-Qaeda terrorism network)

our approach depicts the relationships between LOs to visualize repurposing history

social graph engine



Graph Visualization Module



- Uses GraphML
 - comprehensive and easy-to-use file format for graphs based on the XML structure
 - generated dynamically by the “bridge” with data taken from the network database

```

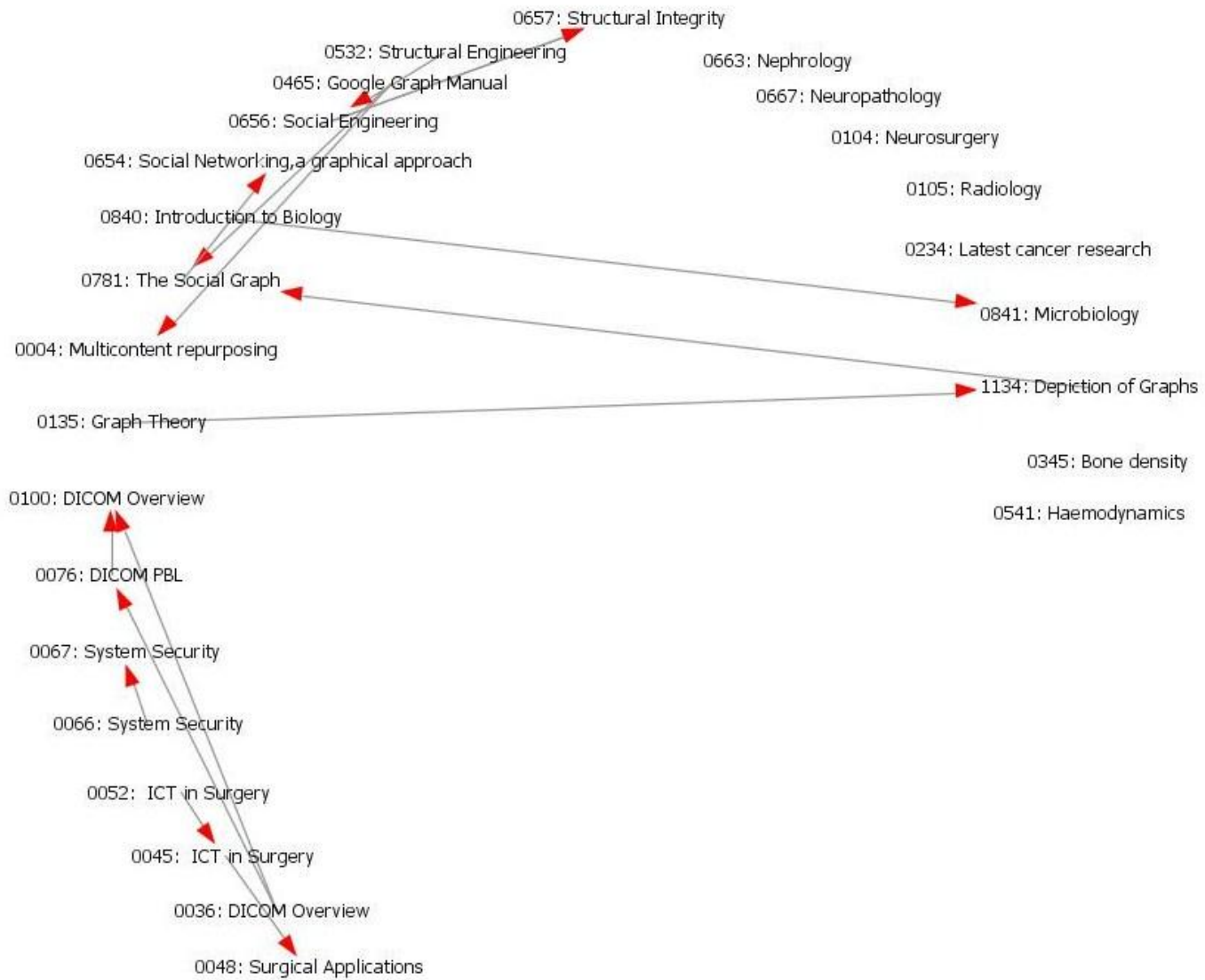
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  <data key="name">0667: Neuropathology</data>
</node>
- <node id="42">
  <data key="name">0104: Neurosurgery</data>
</node>
- <node id="43">
  <data key="name">0105: Radiology</data>
</node>
- <node id="44">
  <data key="name">0234: Latest cancer research</data>
</node>
- <node id="45">
  <data key="name">0841: Microbiology</data>
</node>
- <node id="46">
  <data key="name">1134: Depiction of Graphs</data>
</node>
- <node id="47">
  <data key="name">0345: Bone density</data>
</node>
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<edge id="e1" source="95" target="83"/>
<edge id="e2" source="107" target="131"/>
<edge id="e3" source="119" target="131"/>
<edge id="e4" source="149" target="161"/>
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<edge id="e12" source="34" target="38"/>
<edge id="e13" source="32" target="45"/>
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</graphuml>

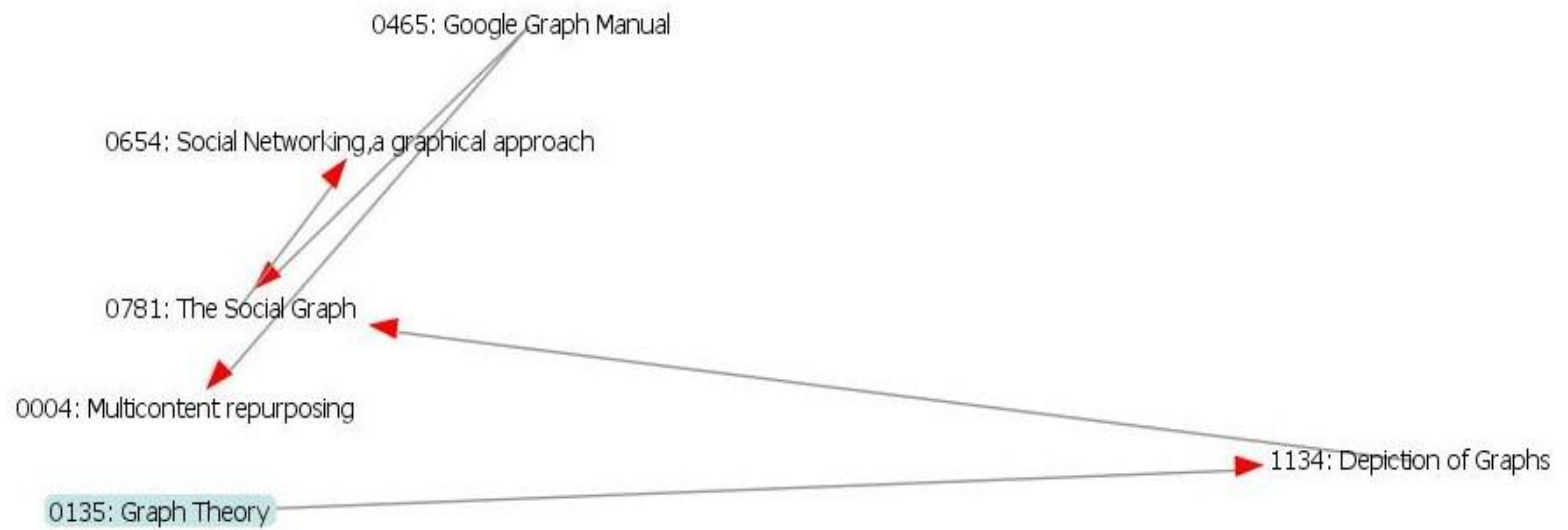
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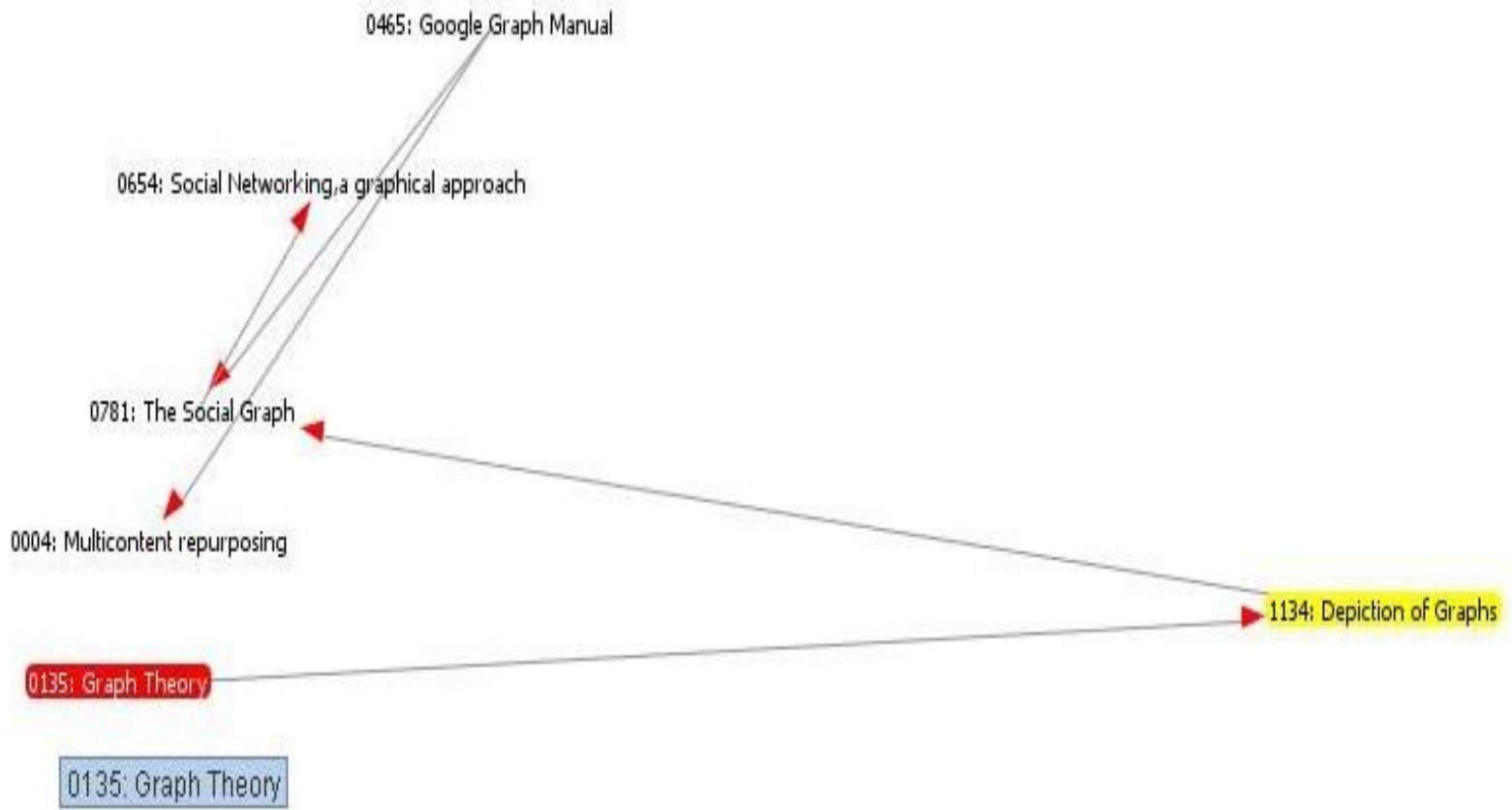

Graph Visualization Module



- coded in Java
 - for the fastest possible drawing of the graph
 - no limitation to the number of nodes
- using the Prefuse toolkit for graph visualization with further optimizations for quick search capability







work in progress



- populate the network
- enrich social interactivity of educational content items
- study the double network dynamics

work done partly within mEducator

- project title: mEducator: Multi-type Content Repurposing and Sharing in Medical Education
- project type: Best Practice Network
- programme: eContentplus
Information Society & Media Directorate
General, European Commission
- contract: ECP 2008 EDU 418006
- duration: 2009-2012
- consortium: 14 partners from 9 EU countries, lead by AUTH
- budget: ~4.500.000 €
- website: <http://www.meducator.net/>



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