Depicting Educational Content Repurposing Context and Inheritance

N. Dovrolis, E. Kaldoudi
School of Medicine
Democritus University of Thrace
Alexandroupolis, Greece

S. Konstantinidis, P. Bamidis
School of Medicine
Aristotle University of Thessaloniki
Thessaloniki, Greece

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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
  – ...

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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
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
(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
• ...

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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*”
the implementation

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

- ELGG PLATFORM
  - ELGG DB
  - ELGG UI
- ELGG DB
- ELGG UI
- JAVA
- PREFUSE TOOLKIT
- PHP
- GRAPH VISUALIZATION MODULE
- GRAPHML
- RETURN GRAPH
- DATA
- REQUEST
- WEB BROWSER

ARCHITECTURE

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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
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
0465: Google Graph Manual

0654: Social Networking, a graphical approach

0781: The Social Graph

0004: Multiconent repurposing

0135: Graph Theory

1134: Depiction of Graphs
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 (GR)

budget: ~4.500.000 €

website: http://www.meducator.net/

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contact: E. Kaldoudi, Assistant Professor, School of Medicine, Democritus University of Thrace, Alexandroupolis, Greece, skype: kaldoudi2, email: kaldoudi@med.duth.gr