Learning Linked Data: Introducing a Competency Framework Illuminated by Mapped Learning Resources

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Part I. Background

Linked Data for Professional Education (LD4PE)
Linked Data for Professional Educators (LD4PE) Project

- Funded by the Institute of Museum and Library Services (IMLS)
  - December 1, 2014 - November 30, 2017

- A project under the jurisdiction of the DCMI Education & Outreach Committee

- Led by:
  - University of Washington, Information School
  - Kent State University, School of Information
  - Dublin Core Metadata Initiative (DCMI)

- Content Partners:
  - Sungkyunkwan University (Korea)
  - Access Innovations
  - Synaptica
  - Elsevier
  - OCLC
1. **Competency Index for Linked Data**
   - defines a set of assertions of the knowledge, skills, and habits of mind required for professional practice in the area of Linked Data.

2. **Toolkit**
   - open, web-based tool set
     - (1) making Saved Sets
     - (2) generating metadata describing learning resources
     - (3) creation of learning maps expressing curricular structures or personal learning journeys superimposed over the competency framework

3. **The Explore Website**

4. **Learning Resource Descriptions**
   - A set of learning resources
     - open sources
     - Described in metadata
     - being mapped to the competencies

5. **Best practices**
Part II. Structure of The Competency Index for Linked Data (CI)

-- The Competency Index is composed of a set of topically arranged assertions of the knowledge, skills, and habits of mind required for professional practice in the area of Linked Data.
“Competency Index”

A thematic set of competencies organized by

• **Topic**

• **Competency**: a tweet-length phrase about knowledge or skills that can be learned

• **Benchmark**: an action that demonstrates accomplishment in a given competency
Example

- **Topic**: Querying RDF Data
  - **Competency**: Understands that a SPARQL query matches an RDF graph against a pattern of triples with fixed and variable values
  - **Competency**: Understands the basic syntax of a SPARQL query
    - **Benchmark**: Uses angle brackets for delimiting URIs.
    - **Benchmark**: Uses question marks for indicating variables.
    - **Benchmark**: Uses PREFIX for base URIs.
Editorial Board met monthly over a period of approximately 18 months.

Competencies were proposed based on:
- Literary Warrant
- Resource Warrant
- Expert Warrant

Guidelines for stylistic consistency when writing competencies were developed

**Competency Index for Linked Data**

Browse by Competency

- New Comp Index (564)
  - Fundamentals of Resource Description Framework (208)
  - Fundamentals of Linked Data (112)
  - RDF vocabularies and application profiles (163)
  - Creating and transforming Linked Data (65)
  - Interacting with RDF data (346)
  - Creating Linked Data applications (0)

View the full Competency Index

Topical Cluster » Topic » Competency » Benchmark
Overview of topics

1. Fundamentals of Resource Description Framework
   - Identity in RDF
   - RDF data model
   - Related data models
   - RDF serialization

2. Fundamentals of Linked Data
   - Web technology
   - Linked data principles
   - Linked Data policies and best practices
   - Non-RDF Linked Data

3. RDF vocabularies and application profiles
   - Finding RDF-based vocabularies
   - Designing RDF-based vocabularies
   - Maintaining RDF vocabularies
   - Versioning RDF vocabularies
   - Publishing RDF vocabularies
   - Mapping RDF vocabularies
   - RDF application profiles

4. Creating and transforming RDF Data
   - Managing identifiers (URIs)
   - Creating RDF data
   - Versioning RDF data
   - RDF data provenance
   - Cleaning and reconciling RDF data
   - Mapping and enriching RDF data

5. Interacting with RDF Data
   - Finding RDF Data
   - Processing RDF data using programming languages
   - Querying RDF Data
   - Visualizing RDF Data
   - Reasoning over RDF data
   - Assessing RDF data quality
   - RDF Data analytics
   - Manipulating RDF Data

6. Creating Linked Data applications
   - Storing RDF data
Explore online 600+ resources described

http://explore.dublincore.net/explore-learning-resources-by-competency/

Explore Learning Resources by Competency

Browse by Competency

- How does this work?
  - New Comp Index (620)
    - Fundamentals of Resource Description Framework (218)
    - Fundamentals of Linked Data (135)
  - RDF vocabularies and application profiles (181)
  - Creating and transforming Linked Data (82)

To Explore Linked Data learning resources, select a competency assertion or topic statement in the adjacent panel to view a listing of associated learning resources.

The Competency Index for Linked Data (CI) constitutes a set of topically arranged assertions of the knowledge, skills, and habits of mind required for professional practice in the area of Linked Data.

This structure is illustrated in the adjacent panel. CI development is expected to openly crowd-source expertise in the development processes under the guidance of the project's CI Editorial Board (CIEB).

Learn more about the Competency Index.

IMPORTANT NOTES:
Competency Index for Linked Data

- Fundamentals of Resource Description Framework (208)
  + Identity in RDF (35)
  + RDF data model (142)
  + Related data models (52)
  + RDF serialization (60)
- Fundamentals of Linked Data (112)
  + Web technology (76)
  + Linked Data principles (53)
  + Linked Data policies and best practices (3)
  + Non-RDF linked data (0)
- RDF vocabularies and application profiles (163)
  + Finding RDF-based vocabularies (14)
  + Maintaining RDF vocabularies (0)
  + Versioning RDF vocabularies (1)
  + Publishing RDF vocabularies (32)
  + Mapping RDF vocabularies (18)
  + RDF application profiles (17)
  + Designing RDF-based vocabularies (1)
- Creating and transforming Linked Data (216)
  + Managing identifiers (0)
  + Creating RDF data (36)
  + Versioning RDF data (0)
  + RDF data provenance (0)
- Interacting with RDF data (346)
  + Maintaining RDF data (0)
  + Publishing RDF data (0)
  + Mapping RDF data (18)
  + Interoperating over RDF data (81)
- Processing RDF data using programming languages (80)
  + Querying RDF data (181)
  + Visualizing RDF data (25)
  + Reasoning over RDF data (81)
- Assessing RDF data quality (0)
  + RDF data analytics (15)
- Creating Linked Data applications (0)
  + Cleaning and reconciling RDF data (12)
  + Mapping and enriching RDF data (25)
- Storing RDF data (0)

Competency Index full version available from http://explore.dublincore.net → Explore

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RDF vocabularies and application profiles (163)

Designing RDF-based vocabularies (127)
- Uses RDF Schema to express semantic relationships within a vocabulary. (51)
  Correctly uses sub-class relationships in support of inference. (20)

Correctly uses sub-property relationships in support of inference. (23)

Knows the naming conventions for RDF properties and classes. (8)

Reuses published properties and classes where available. (23)

- Coins namespace URIs, as needed, for any new properties and classes required. (14)
  Drafts a policy for coining URIs for properties and classes. (1)
Part III. Using the Learning Resources Connected with the Competencies

• Demo: Finding related learning resources
• Explanation: How a learning resource is described and mapped to CI
Where should I start?  

http://explore.dublincore.net/

• Start at the top of the hierarchy and drill down.  
• Select a topic cluster, expand the menu, and  
• look through the child options.  

Browse Competency Index

Search for Resources
By Competency
By Keyword
Clicking on the competency’s text

Descriptions and user ratings help one make decisions about which resources to investigate further.  

--- related resources are displayed on right side of the page.

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The resource description page contains additional metadata and full text of the description.

From this page, you can access the resource itself through the URL.
How are the learning resources described?

Publishing Data From The Smithsonian American Art Museum As Linked Open Data

This video discusses the challenges faced when publishing museum data as Linked Data: the databases are large and complex; the information is richly structured and varies from museum to museum; it is difficult to link the data to other datasets. The speaker demonstrates the end-to-end process of starting with the original source data, modeling the data with respect to an ontology of cultural heritage data, linking the data to DBpedia, and then publishing the information as Linked Open Data.

URL: https://www.youtube.com/watch?v=1Vaytr09H1w
Keywords: Ontology, Karma, R2RML, DBpedia
Author: Szekely, Pedro
Date created: 2013-07-24 07:00:00.000
Language: http://id.loc.gov/vocabulary/iso639-2/eng
Time required: P1OM
Educational use: instruction
Educational audience: student
Interactivity type: expositive

• Competencies

Knows methods for generating RDF data from tabular data in formats such as Comma-Separated Values (CSV).

Uses available resources for named entity recognition, extraction, and reconciliation.

600+ openly available learning resources [webinars, podcasts, lectures, web pages, readings …]

• Resources are Indexed at the topic and competency Level

• Move mouse over the competency can see its location in the index.
Try it! Go to:
http://explore.dublincore.net/ Choose “Explore”

Explore Learning Resources by Competency

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