Linked Data for Professional Education (LD4PE)

A project of the DCMI Education & Outreach Committee

http://explore.dublincore.net/

DC-2016 Workshop
15 October, 2016
Copenhagen, Denmark
Workshop Agenda

• **1:30-1:40:** Introductions and setup (Mike Crandall)
• **1:40-2:00:** Overview of competencies and the Linked Data Competency Index (Tom Baker)
• **2:00-2:30:** Overview and demonstration of the LD4PE website features (David Talley/Stuart Sutton)
• **2:30-3:00:** First interactive session- Site Layout and Basic Navigation (Marcia Zeng/Mike Crandall)
• **3:00-3:30:** Break
• **3:30-4:00:** Second Interactive Session- The Competency Index (Marcia Zeng/Mike Crandall)
• **4:00-4:30:** Third Interactive Session- Interacting with Learning Resources (Marcia Zeng/Mike Crandall)
• **4:30-5:00:** Fourth Interactive Session- Saved Sets (Marcia Zeng/Mike Crandall)
• **5:00-5:25:** Fifth Interactive Session- Learning Maps (Marcia Zeng/Mike Crandall)
• **5:25-5:30:** Wrapup (Mike Crandall)
What Is LD4PE Exploring Linked Data?

- Linked Data for Professional Education (LD4PE) is a project under the jurisdiction of the DCMI Education & Outreach Committee, funded by the Institute of Museum and Library Services (IMLS).
  - The intent is that the LD4PE website will continue to be supported by DCMI and its members as part of DCMI's larger education and outreach activities, and be used in other activities as appropriate once the project is completed.

- The project is developing a Web-based Linked Data platform to support the structured discovery of the learning resources available online by open educational resource (OER) and commercial providers.
  - At the heart of the Linked Data website is a competency framework for Linked Data that supports indexing learning resources according to the specific competencies, skills, and knowledge they address.
  - To do this, the LD4PE website itself leverages Linked Data technology by assigning global identifiers (URIs) to statements of competency, then citing those URIs in metadata descriptions of learning resources.
Who Is Involved?
Key Project Personnel

• University of Washington
  – Michael Crandall
  – Stuart Sutton
  – David Talley
  – Abi Evans

• Kent State University
  – Marcia Zeng
  – Sean Dolan

• DCMI
  – Stuart Sutton
  – Tom Baker
  – Joseph Chapman

• Content Partners
  – Elsevier
    • Michael Lauruhn
  – Access Innovations
    • Marjorie Hlava
  – Synaptica
    • David Clarke
  – Sungkyunkwan University
    • Sam Oh
  – OCLC
    • Eric Childress
Architecture

LRMI Editor
Learning Resource Descriptions

ASN Editor
Competency Descriptions

Triplestore
Web-based Tools Recipes & Roadmaps

ASN = Achievement Standards Network
LRMI = Learning Resource Metadata Initiative
Project Deliverables

- **Competency Framework.** A “Competency Index for Linked Data” based on the Achievement Standards Network Description Language (ASN-DL) for describing formally promulgated competencies and benchmarks.

- **Toolkit.** An openly available, web-based tool set to support the generation of RDF metadata describing: (a) learning resources; and (b) ASN-based competency frameworks and SKOS-based concept schemes.

- **Learning Resource Descriptions.** A set of cataloged learning resources that have been mapped to the competencies and benchmarks of the Competency Index to support competency-based resource discovery by teachers, trainers and learners.

- **LD4PE Website.** A website to be managed by DCMI as part of its educational agenda for open discovery of competency-based learning resources, access to the toolkit, learner trajectory maps, and supporting resources.

- **Best Practices.** Readily accessible best practice documentation for all processes, from community-based competency framework development and LR description through learner trajectory creation.
Indexing “by competency”

Thomas Baker
Dublin Core Metadata Initiative

LD4PE Project
DC-2016, Copenhagen, Denmark
14-15 October 2016
“Competency Index”

• **Topic**: a thematic set of competencies
  
  – **Competency**: a tweet-length phrase about knowledge or skills that can be learned
  
  • **Benchmark**: an action that demonstrates accomplishment in a given competency
LD4PE Competency Index

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.
• **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.
  
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LD4PE Competency Index

Topics

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

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

- 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

- 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

- 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
  - Creating Linked Data applications
    - Storing RDF data
LD4PE Competency Index

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:** **Knows** 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.
LD4PE Competency Index

“House style”

Competencies

• Understands
• Knows
• Recognizes
• Differentiates ...

Understanding (learning)

Benchmarks

• Uses
• Expresses
• Demonstrates
• Distills
• Converts ...

Doing (exam questions, homework assignments)
LD4PE Competency Index

Example

- **Competency**: Knows Web Ontology Language, or OWL (2004), an RDF vocabulary of properties and classes that extend support for expressive data modeling and automated inferencing (reasoning).

- **Competency**: Knows that the word “ontology” is ambiguous, referring to any RDF vocabulary, but more typically a set of OWL classes and properties designed to support inferencing in a specific domain.

Ideally, spells out acronyms and provides context to give non-expert readers a rough idea what they mean.
LD4PE Competency Index
Topics = Scope

- **Fundamentals of Resource Description Framework**
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  - Related data models
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  - Linked Data policies and best practices
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  - Manipulating RDF Data
- **Creating Linked Data applications**
  - Storing RDF data
LD4PE Competency Index

Organizing principles

• **Follows a domain map** brainstormed by a workshop of experts in an earlier project

• **Avoids specifying levels of difficulty** because learners come from different backgrounds (computer versus library science)

• **Avoids implying ranking or ordering topics** for the same reasons

Competencies are building blocks that can be assembled into different courses or curricula.
LD4PE Competency Index

Audience

• Independent learners wanting to learn Linked Data technology

• Professors and trainers wanting to design and teach courses
LD4PE Competency Index

Granularity

• **Enough topics** to convey a map of the domain to be learned
• **Enough detail** to characterize the nature of competency in the domain
• **Not so much detail** that it reads like a manual or is likely to go out of date

Other competency indexes make other design choices, e.g., to support exams or certification.
LD4PE Competency Index

Sources of competencies

• **Expert warrant:** competencies are proposed and formulated by experts

• **Literature:** competencies are described in the literature

• **Available learning resources:** competencies are the topic of tutorials, YouTube videos, books, or courses
Feature Demonstration

HTTP://EXPLORE.DUBLINCORE.NET/
INTERACTIVE SESSIONS
A. You are a professor teaching an introductory course on Semantic Web and Linked Data concepts. One of the topics you wish to cover is the RDF Data Model. Specifically, you want to emphasize the differences between RDF and other data models.

Your task is comprised of two steps:

• Browse through the Competency Index until you locate a competency which will meet the learning objective described above.

• Choose an appropriate learning resource which has been aligned to that competency.

• Feedback: https://www.surveymonkey.com/r/LD4PE (Questions 1-3)
Session 2 and 3: The Competency Index and Learning Resources

B. You work for a local government agency which is considering replacing a traditional relational database with a triple store (in order to better meet mandates for openness and transparency). However, some of your colleagues are wary of having to learn a “whole new language” to query data. It is your responsibility to gather information on what SPARQL is and how it is used.

Your task is comprised of two steps:

- Browse through the Competency Index until you locate a competency which will meet the learning objective described above.

- Choose an appropriate learning resource which has been aligned to that competency.

Feedback: [https://www.surveymonkey.com/r/LD4PE](https://www.surveymonkey.com/r/LD4PE) (Questions 4-20)
Session 4: Saved Sets

C. While researching SPARQL in Prompt B, you found that there are a handful of resources that describe the query language very well, and you want to save these resources in one place so that you can send a single link to some of your co-workers referring them to the resources. You notice that the website has a “Saved Sets” functionality, and decide to try it out.

Your task is comprised of three steps:
• Create a new “Saved Set” and name it something meaningful you will remember later. Also add a description for additional context.
• Add several SPARQL related resources to this Saved Set (one of these might be the resource you found for the previous prompt).
• Make sure the Saved Set is “public”, so that your co-workers will be able to see it.

Feedback: https://www.surveymonkey.com/r/LD4PE2 (Questions 1-8)
Session 5: Learning Maps

D. In this final prompt, you are again the professor from Prompt A, who was researching the RDF Data Model for your course on Semantic Web and Linked Data concepts. You quickly realize that it may be difficult for students to see the connections between the various components of Linked Data (RDF, SPARQL, OWL, the various serializations for publishing data). This means that presenting the concepts in the correct order will be very important. To help organize your thoughts and plan the curriculum for the course, you decide to use the websites’ “Learning Maps” functionality.

Your task is comprised of three steps:

• Create a new “Learning Map” and name it something meaningful you will remember later. Also add a description for additional context.

• Add several Competencies to the Learning Map. For example, you may want to start out with the RDF Data Model and then move on to a closely related concept, such as how to query data represented in RDF. The Learning Map functionality allows you to do this using the same skills you learned from Prompt A and Prompt B.

• When you are done adding Competencies to your Learning Map, look at the order in which they appear. Can you think of a more logical way to group them? Try re-arranging the order of the Competencies in your Learning Map.

Feedback: [https://www.surveymonkey.com/r/LD4PE2](https://www.surveymonkey.com/r/LD4PE2) (Questions 9-15)
QUESTIONS?

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