

• **Project Title:** Linked Data for Professional Education (LD4PE)

• **Activities Completed during This Reporting Period:**

Six deliverables were described in the grant proposal:

- 1) building a Competency Index for Linked Data,
- 2) creating a suite of web-based tools to manage the Index and resources,
- 3) collecting, vetting and cataloging existing third party resources under the Competency Index,
- 4) creating targeted examples of learning resources,
- 5) providing a public portal for use of the project results (the Exploratorium), and
- 6) creating best practice documentation.

Detailed activities under each of these goals were outlined in the proposal, and scheduled as shown in the chart below (the numbers in column 1 refer to each of the deliverables listed above):

DEL	Year 1 (Dec 2014 – Nov 2015)	D	J	F	M	A	M	J	J	A	S	O	N
1	Gather existing curricular examples for competency content analysis												
1	Analyze, derive and draft competencies from examples												
1	Refine the structure and topical clustering of the Index												
1	Serialize draft competencies in the ASN & iteratively refine												
1	Assessment of competency gaps revealed by cataloging LR; refine index												
1	Stakeholder formative assessment of Index and subsequent refinement												
2a	Adapt Gateway editor for LRMI metadata descriptions and tagging												
2b	Adapt ASN mapping tool for learning map creation; enhance visualization												
3	Discover, inventory and prepare LRs for cataloging/tagging												
3	Catalog, align & assess test set for quality/utility												
3	Catalog, align & assess discovered and Partner LRs												
4	Collaborate with Partners on recipe-generation criteria												
4	Creation of Partner recipes												
4	Review and refine Partner-generated recipes and development guidelines												
5	Install software and initial plugins for pilot Exploratorium website												
5	Evaluate/install theme that accommodates the Exploratorium												
5	Develop data integration between tools and Exploratorium												
5	Develop navigation interface to the Index with links to aligned recipes												
5	Iteratively assess the user experience of the Exploratorium												
5	Iteratively refine based on the user experience assessments												
5	Develop repository infrastructure for Best Practice repository												
6	Develop best practices for Index, recipe and metadata generation												
6	Assess and refine Index, recipe and metadata generation Best Practices												

Progress on each of these activities is discussed briefly below; examples of outputs are provided in Appendices as noted.

1. **Competency Index for Linked Data (the “Index”).**

**Proposal Deliverable Statement:** The Index will state and describe a set of learning objectives: relevant skills, practices, and knowledge. Learning objectives will be assigned global identifiers (URIs) and published on the open Web in machine-readable RDF schemas (i.e., as Linked Data).

**Progress to Date:** The Competency Index is well along in development, starting from our original inventory of learning topics (<http://lld.ischool.uw.edu/wp/learning/inventory/>) created through an earlier IMLS planning grant. As indicated in the cluster of activities under this objective in our

schedule, we have used the large body of learning resources (discussed below in (3)) to derive competencies from the body of work in this domain (resource warrant) but have also created the Editorial Board, which is comprised of leading experts in the field of Linked Data to review and comment on the Index and modify continuously (expert warrant). We have also used available published texts on RDF and linked data (literary warrant).

The Editorial Board engages others in the field as needed to extend their reach, and we have also made a concerted effort to expose the work to a broader audience through presentations at a number of domestic and international conferences (LITA Forum, DCMI Annual Conference, ICADL 2015), with more scheduled in the coming months (ALISE 2016, ALA MidWinter). See Appendix A and B for examples of posters presented at DC 2015 and ICADL 2015. Feedback from these sessions is also being incorporated into the Index through the Editorial Board's review process (user warrant). As discussed in our original proposal, the Index will be in a fluid state throughout the grant period (and beyond), but is approaching a reasonably steady state at this point, and is being used to categorize our collection of learning resources (see (3) below).

We have also exposed an early version of the Index and the learning resources associated with the competencies in the Exploratorium (<http://explore.dublincore.net/linked-data-learning-resources/>) to demonstrate the capability, though this visible display currently lags behind the current Index, which is attached as Appendix C. In early discussions with potential reviewers such as the Library of Congress PCC Standing Committee on Training, which has just completed an environmental scan of training resources in the area of Linked Data, there is enthusiasm for the LD4PE approach and a willingness to participate in review and refinement at the appropriate time.

**Status:** This deliverable and associated activities are all on schedule, and will continue to be iterated upon in the coming year.

## 2. A suite of Web-based tools customized for use in the Exploratorium:

### **Proposal Deliverable Statement:**

- a. **An editor for creating RDF metadata about learning resources.** For tagging content, the project will adapt the Learning Resource Metadata Initiative (LRMI) standard,<sup>i</sup> which in turn extends the schema.org vocabulary used by Google, Yahoo, and Bing to enhance their search results. An editor based on LRMI metadata and adapted from the existing Gateway to 21<sup>st</sup> Century Skills<sup>ii</sup> metadata editor provides functionality for describing learning resources and aligning the metadata record to statements of skills and knowledge in machine-readable competency frameworks, thereby allowing customized alignment with the LD4PE Project's Index.
- b. **A tool for creating learning trajectory maps.** A learning trajectory map arranges a set of learning objectives into a pedagogically effective sequence. Such maps can represent the curricular structure of a course or a highly personalized learning path. The Achievement Standard Network (ASN)'s existing tool for map development would be adapted to save maps as RDF data, which can be published as Linked Data for others to use.

**Progress to Date:** The first iteration of the LD4PE learning resource editor is finished and has served as the project cataloging tool for the past 4-5 months. It has been used to generate nearly 400 learning resource metadata descriptions following an application profile of the LRMI schema. The metadata output from the tool is stored in the project triple store. The tool fully supports create, read, update and delete functions. A second iteration of the editing tool will be made publicly available in the 1<sup>st</sup> quarter of 2016. A brief screencast documenting the design considerations for both the learning resource editor and a companion editor for creating competency frameworks is available at <http://bit.ly/LD4PE-EdOver>. See Appendix D for screenshots of the learning resource editor.

While the ASN enterprise editor for creating competency frameworks was used during the early stages to jumpstart the machine encoding of the project competency framework data, it quickly became obvious that ongoing development of the competencies by people without the extensive knowledge necessary to operate the enterprise editor called for a more lightweight, easy-to-use solution. Following the solution stack developed in creating the learning resource editor in AngularJS, a light weight, intuitive editor for creating, reading, updating, and deleting competency assertions is near completion with deployment anticipated in January. Both the learning resource and the competency framework editors will be made publicly available through the Exploratorium website as a stand-alone toolkit.

Work on the learning trajectory map functionality has been delayed and will begin early next year, pending full implementation of the Competency Index in the Exploratorium and input of the learning resources. We wanted to make sure that the navigation through the competencies and their resources had been tested (to begin early next year) before adding the second layer of map development. However, given the rapidity that we were able to implement the editor based on the existing ASN functionality, we anticipate that this second layer of interaction with the resources will proceed smoothly and allow us to validate with users in the field by the second quarter of next year.

**Status:** The learning resource editor has been completed and is in use and a competency framework editor is near completion; the learning trajectory functionality is delayed but we anticipate no issues in completing within the next quarter.

### 3. **Metadata for a set of third-party learning resources.**

**Proposal Deliverable Statement:** *Cataloging a set of resources with reference to the Index will allow the LD4PE Project to test the LRMI metadata schema and tools to assess their utility for discovery and enhanced retrieval, identify gaps in the Index, and seed the Exploratorium.*

**Progress to Date:** As mentioned above, the LRMI metadata schema has been used successfully to catalog nearly 400 learning resources, and has allowed us to do preliminary (and quite interesting) gap analyses on publicly available learning resources based on the range of competencies covered, learning resource types, and on the level of learner expertise addressed. These analyses are shaping not only our search for additional existing resources, but also the development of newly created resources by our content partners in the coming months. As discussed in (5) below, the resources are being exposed in the Exploratorium directly linked to the

competencies they address as a means of navigating the content and will support development of the learning trajectories early next year as discussed in (2) above.

**Status:** Progress is on target for this deliverable, with the metadata schema in place and being used to catalog learning resources, conduct gap analyses of both competencies and resources, and present resources in the Exploratorium, as planned.

4. **An exemplary set of targeted learning resources (“recipes”).**

**Proposal Deliverable Statement:** *LD4PE project partners will create a number of exemplary learning resources targeted at specific competencies – “recipes” – as demonstrations of best practices in resource design and development.*

**Progress to Date:** As mentioned above in (2), we have identified nearly 400 resources that can be used as aides in the teaching of one or more of the competencies. These resources have been exposed in the Exploratorium in association with relevant competencies (see Appendix E for a screen shot). Based on field feedback and our gap analyses on the existing resources in relation to the competencies, we will prioritize areas for our content partners to begin creation of new resources that will fill in gaps and provide new materials to support the competencies. We anticipate that this work will begin in the first quarter of next year.

In the meantime, OCLC, one of our content partners, has created a static subset of linked data triples (covering the field of library science) from several of their databases, and provided that as a resource for other content partners to develop exercises and examples against. This will be an important component in the learning resources, in that educators will be able to predict results of exercises using this static set, which is impossible in the wild with linked data, and often causes difficulties for students and their teachers when results are unpredictable. The data set will be hosted for an extended period of years by OCLC as a downloadable file, and DCMI plans to put up a query interface on the LD4PE site in the next few months for public use.

**Status:** We are on target with collection and organization of already existing resources and the development of the key static dataset for use in new learning resources, but behind in the development of those new resources. As we ramp up public feedback and continue our analysis of missing resources through the more fully developed Competency Index, we will catch up on the new resource development, and expect to be in full production by the end of the first quarter of the new year.

5. **An Exploratorium pilot website.**

**Proposal Deliverable Statement:** *The project website (the Linked Data Exploratorium or LDE) will primarily provide competency-based access to learning resources. In addition, it will provide a publication venue both for learning resources (such as the “exemplary” set above) and learning trajectory maps. Developed and managed by the LD4PE Project, the website will mature to become part of the Dublin Core Metadata Initiative's freely available toolset. Out-of-the-box social media functions, including broadcast and recommender systems, will foster the engagement of domain experts, teachers and trainers, learners, and resource providers.*

**Progress to Date:** The Exploratorium is in development and available for use as it evolves. Most major functionality is in place, with the exception of the Learning Trajectory mapping function as discussed in (2) above. We are gradually introducing the social media functions such as ranking of resources, commenting on the various Index nodes, and other means of providing user input to the ongoing evolution of the platform, which will be critical for future development. We are also publishing our documentation (see (6) below) here so that users will have ready access to this information as needed. The homepage of the Exploratorium is shown in Appendix F.

**Status:** This deliverable is on schedule, and will be a major focus of effort in the next six months as we begin developing more features and conduct user testing to make sure that the services are usable and appropriate.

6. **Best-practice documentation.**

**Proposal Deliverable Statement:** *Best-practice documents will cover:*

- a. *Guidelines for the principled development and management of competency frameworks;*
- b. *Guidelines for creating metadata about learning resources and for aligning those resources to competencies/skills and knowledge; and*
- c. *Guidelines for the creation of learning resources targeted to specific competencies.*

**Progress to Date:** While we are still in the process of developing most of the documentation specified in this deliverable, we have been conscientious about maintaining our progress notes and lessons learned both in the project wiki and in our Github repository. To date, we have published several briefing papers covering the underpinnings of our model for both the Competency Index as well as the metadata used for tagging content. We have also produced a high level overview of the LD4PE architecture. See Appendix G for examples of these briefing papers as published on the Exploratorium.

**Status:** We are on target with activities for this deliverable, and anticipate having a rich set of resources available by the end of the project for others to use in similar endeavors.

• **Changes:** No changes in project personnel, budget allocation, scope or schedule have occurred. We expect to complete all project activities in the remaining months of the grant, within budget and on time.

• **Findings or Accomplishments during This Reporting Period:** As described above and shown in the Appendices below, we have completed or made good progress against all of our major activities. The Indexing tool, the Competency Index, and the Exploratorium are major outputs, as are the posters and briefing papers we have produced to date. We anticipate that all these materials will ultimately rest in the Exploratorium for others to use and build upon.



## Appendix A: DC 2015 LD4PE Poster



## A Competency-Based Framework for DCMI's Professional Education and Training Agenda

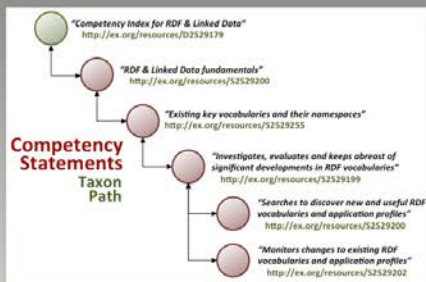
### LD4PE Architecture

The Exploratorium is a Web-Based repository with a WordPress front end and a RDF backend for learning resources and competency framework data.



### Competency Framework Modeled in RDF

Using the *Achievement Standards Network Description Language* (ASN-DL), a Competency Framework is being created embodying assertions of knowledge, skills, and habits of mind for successful creation, deployment and maintenance of Linked Data.

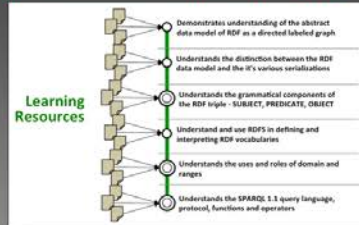


### Crowd-Sourcing Expertise in Framework Development

Unlike traditional development of competency frameworks by small bodies of experts, the LD4PE project is developing methods for more open submission of candidate competency assertions with final decisions being made by an Editorial Board (CIEB). Open tools such as GitHub, and Google Docs are being used to gather candidate assertions and enable their subsequent public vetting.



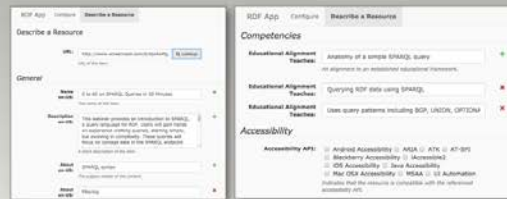
### Learning Resources-to-Competency Mapping



Since individual assertions in the Competency Framework and Learning Resources are identified by URI, they can be linked making it possible to map Resources to the knowledge, skills, and habits of mind being taught or assessed.

### Browser-based Data Editors

A toolkit of new AngularJS editors is under development for 3<sup>rd</sup> party creation of Learning Resource and Competency descriptions. The editors can be used offline or directly linked to a triplestore. The Learning Resource description editor is based on an application profile of the LRMI specification—the learning resource description extension to schema.org.



### Editor Configurability

The Learning Resource editor and the Competency Framework editor are configurable to deploy application profiles of their core ontologies. Thus, the LRMI-based Learning Resource editor and the ASN-DL based Competency Editor can be configured (and re-configured) to utilize different value vocabularies as well as different property extensions



### Learner "Transit" Maps



LD4PE stands in sharp contrast to other projects by not prescribing a single curricular point of view but in providing instead the means for instructors, trainers and learners to chart multiple, diverse pathways.

These pathways or journeys may be defined as public/private, individual/collective, or prescribed/exploratory. Each journey's graph provides a different pathway for discovering and traversing Learning Resources that have been described and aligned to the competency nodes of the Framework graph.



## Appendix B: ICADL 2015 LD4PE Poster

# Linked Data for Professional Education

**LD4PE**

INSTITUTE of Museum and Library SERVICES

Sam Oh<sup>1</sup>, Marcia L. Zeng<sup>2</sup>, Michael Crandall<sup>3</sup>, Stuart A. Sutton<sup>3</sup>, Thomas Baker<sup>1</sup>  
<sup>1</sup>Sungkyunkwan University South Korea || <sup>2</sup>Kent State University, USA || <sup>3</sup>University of Washington, USA

## Linked Data Exploratorium

The LD4PE project is developing a **Web-based, Linked Data Exploratorium** website to support for the structured discovery of the learning resources available online through both open and commercial providers.

<http://explore.dublincore.net/>

## Competency Index Development

**Competency Index structure:**  
 Topical Cluster » Topic » Competency » Benchmark

The Competency Index (CI) for Linked Data is comprised 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.

## Learning Resources

SPARQL Graph Linked Data  
 Triple Query Linked Data Principles  
 SPARQL Linked Data Principles  
 LD4PE

- ✓ curricular structures and syllabi
- ✓ packages of "how-to" videos
- ✓ step-by-step instructions
- ✓ tools and codes prepared for exercises

## The Architecture

At the heart of the Exploratorium is a **competency framework** for Linked Data practice that supports indexing **learning resources** according to the specific competencies they address.

ASN Frameworks  
 Concept Schemes  
 Social Recommendations

LRMI Editor  
 ASN Editor  
 Learning Resource Descriptions  
 Competency Descriptions

Triplestore  
 Web-based Tools  
 Recipes & Roadmaps

ASN Achievement Standards Network  
 LRMI Learning Resource Metadata Initiative

## Deliverables of the LD4PE project

- Competency Framework.** RDF-modeled "Competency Index for Linked Data" (Index) 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: (a) generation of RDF metadata describing learning resources; and (b) creation of learner trajectory maps expressing curricular structures or personal learning journeys superimposed over the competency framework.
- Learning Resource Descriptions.** A set of cataloged learning resources that have been mapped to the competencies and benchmarks of the Index to support competency-based resource discovery by teachers, trainers and learners.
- Exploratorium.** 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 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.

LD4PE PARTNERS: SUNGKYUNKWAN UNIVERSITY, KENT STATE UNIVERSITY, OCLC, INFORMATION SCHOOL UNIVERSITY OF WASHINGTON

## Appendix C: Partial Competency Index

### COMPETENCY INDEX IN DEVELOPMENT

#### [A] Fundamentals of Resource Description Framework

##### [B] Identity in RDF

##### [B] RDF data model

[C] Knows the subject-predicate-object component structure of a triple

[C] Understands the difference between literals and non-literals

[C] Understands that any URI or literal denotes some "thing" in the world whether real, imagined, or conceptual; and, all things are called "resources"

[C] Understands that "resources" may be divided into groups called classes and the members of a class are known as instances of the class (rdf:type)

[C] Understands the use of datatypes and language tags with literals

[C] Understands blank nodes and their appropriate use

[C] Formulates QNames as a shorthand mechanism in writing prefixes for long URIs

[D] Uses prefixes for URIs in RDF specifications and data

[C] Understands the concept of the named graph

##### [B] Related data models

##### [B] RDF serialization

[C] Understands that RDF serializations and graphical representations are just multiple alternative ways to write down, or "encode", a set of triples, i.e., the "RDF graph"

#### [A] Fundamentals of Linked Data

##### [B] Web technology

##### [B] Linked data principles

##### [B] Linked Data architectures and services

##### [B] Linked Data policies and best practices

##### [B] Non-RDF Linked Data

#### [A] RDF vocabularies

##### [B] Finding RDF vocabularies

[C] Retrieves and accesses RDF data from the "open Web"

##### [B] Maintaining RDF vocabularies

##### [B] Versioning RDF vocabularies

##### [B] Publishing RDF vocabularies

##### [B] Mapping RDF vocabularies

##### [B] RDF application profiles

#### [A] Creating and transforming RDF Data

##### [B] Managing identifiers (URIs)

##### [B] Creating RDF data

[C] Structures data using blank nodes where appropriate

##### [B] Versioning RDF data

##### [B] RDF data provenance

##### [B] Cleaning and reconciling RDF data



[B] Mapping and enriching RDF data

[A] Interacting with RDF Data

[B] Finding RDF Data

[C] Retrieves and accesses RDF data from the "open Web"

[C] Uses relevant resources to discover existing Linked Data datasets

[C] Monitors and updates lists which report the status of SPARQL endpoints

[C] Uses available vocabularies for dataset description to support their discovery

[C] Registers datasets with relevant services for discovery

[B] Programming RDF Data

[B] Querying RDF Data

[C] Understands the "basic graph pattern" (BGP) of a SPARQL query as a set of triple patterns.

[C] Understands that the most basic SPARQL query matches the triples of an RDF graph against a triple pattern consisting of fixed and variable values

[C] Understands the role of punctuation in a SPARQL query

[D] Uses angle brackets for delimiting URIs

[D] Uses question marks for indicating variables

[C] Formulates advanced queries on data containing blank nodes

[C] Uses PREFIX for URIs in SPARQL queries

[C] Demonstrates a working knowledge of the forms and uses of SPARQL result sets (SELECT, CONSTRUCT, DESCRIBE, and ASK)

[D] Uses the SELECT clause to identify the variables to appear in a table of query results

[D] Uses the WHERE clause provide the graph pattern to match against the graph data

[D] Uses variables in SELECT and WHERE clauses to yield a table of results

[D] Uses ASK for a simple True/False result in testing whether a query pattern has a solution

[D] Uses DESCRIBE to extract a single graph containing RDF data about resources

[D] Uses CONSTRUCT to extract and transform results into a single RDF graph specified by a graph template

[C] Understands how to combine and filter graph patterns using operators such as UNION, OPTIONAL, FILTER, and MINUS

[D] Uses UNION to formulate queries with multiple possible graph patterns

[D] Uses OPTIONAL to formulate queries to return the values of optional variables when available

[D] Uses FILTER to formulates queries that eliminate solutions from a result set

[D] Uses NOT EXISTS to limit whether a given graph pattern exists in the data

[D] Uses MINUS to remove matches from a result based on the

- evaluation of two patterns
- [D] Uses NOT IN to restrict a variable to not being in a given set of values
- [C] Understands the major SPARQL result set modifiers, e.g., to limit or sort results, or to return distinct results only once
- [D] Uses ORDER BY to define ordering conditions by variable, function call, or expression
- [D] Uses DISTINCT to ensure solutions in the sequence are unique
- [D] Uses OFFSET to control where the solutions processed start in the overall sequence of solutions
- [D] Uses LIMIT to restrict the number of solutions processed for query results
- [D] Uses projection to transform a solution sequence into one involving only a subset of the variables
- [C] Understands the use of SPARQL functions and operators
- [D] Uses the regular expression (regex()) function for string matching
- [D] Uses aggregates to apply expressions over groups of solutions (GROUP BY, COUNT, SUM, AVG, MIN) for partitioning results, evaluating projections, and filtering
- [D] Uses the lang() function to return the language tag of an RDF literal
- [D] Uses the langMatches() function to match a language tag against a language range
- [D] Uses the xsd:decimal(expn) function to convert an expression to an integer
- [D] Uses the GROUP BY clause to transform a result set so that only one row will appear for each unique set of grouping variables
- [D] Uses the HAVING clause to apply a filter to the result set after grouping
- [C] Differentiates between a Default Graph and a Named Graph, and formulates queries using the GRAPH clause
- [D] Formulates advanced queries using FROM NAMED and GRAPH on local data
- [D] Formulate advanced queries using FROM NAMED on remote data
- [C] Formulate advanced queries using subqueries
- [C] Uses a temporary variable to extend a query
- [C] Understands the role of Property Paths and how they are formed by combining predicates with regular expression-like operators
- [C] Understands how to perform Federated Searches
- [D] Formulates advanced queries on a remote SPARQL endpoint using the SERVICE directive
- [D] Uses federated query to query over a local graph store and one or more other SPARQL endpoints
- [D] Pulls data from a different SPARQL endpoints in one single query using the SERVICE directive
- [C] Converts/manipulates SPARQL query outputs (RDF/XML, JSON) to the

exact format required by a third party tools and APIs

[C] Formulates queries using FROM with URLs and local files

[C] Reads and understands high-level descriptions of the classes and properties of a dataset in order to write queries

[C] Uses available tools, servers, and endpoints to issue queries against a dataset

[D] Execute SPARQL queries using the Jena ARQ command-line utility

[D] Queries multiple local data files using ARQ

[D] Uses ARQ to evaluate queries on local data

[D] Uses Fuseki server to evaluate queries on a dataset

[D] Queries multiple data files using Fuseki

[D] Accesses DBPedia's SNORQL/SPARQL endpoint and issues simple queries

[B] Visualizing RDF Data

[C] Uses publicly available tools to visualize data

[D] Uses Google FusionTables to create maps and charts

[C] Distills results taken from large datasets so that visualizations are human-friendly

[C] Converts/manipulates SPARQL query outputs (RDF-XML, JSON) to the exact format required by a third party tools and APIs

[B] Reasoning over RDF

[B] Assessing RDF data quality

[B] RDF Data analytics

[C] Uses available ontology browsing tools to explore the ontologies used in a particular dataset

[B] Manipulating RDF Data

[C] Understands the SPARQL Graph Store HTTP protocol for editing graphs on remote servers

[C] Uses SPARQL to inserting, deleting, modifying RDF data

[D] Uses POST to add triples to an existing graph

[D] Uses GET to retrieve triples from a default graph or a named graph

[D] Uses PUT to insert set of triples into a new graph (or replace an existing graph)

[D] Uses DELETE to remove a graph

[D] Uses proper syntax to request specific media types, such as Turtle

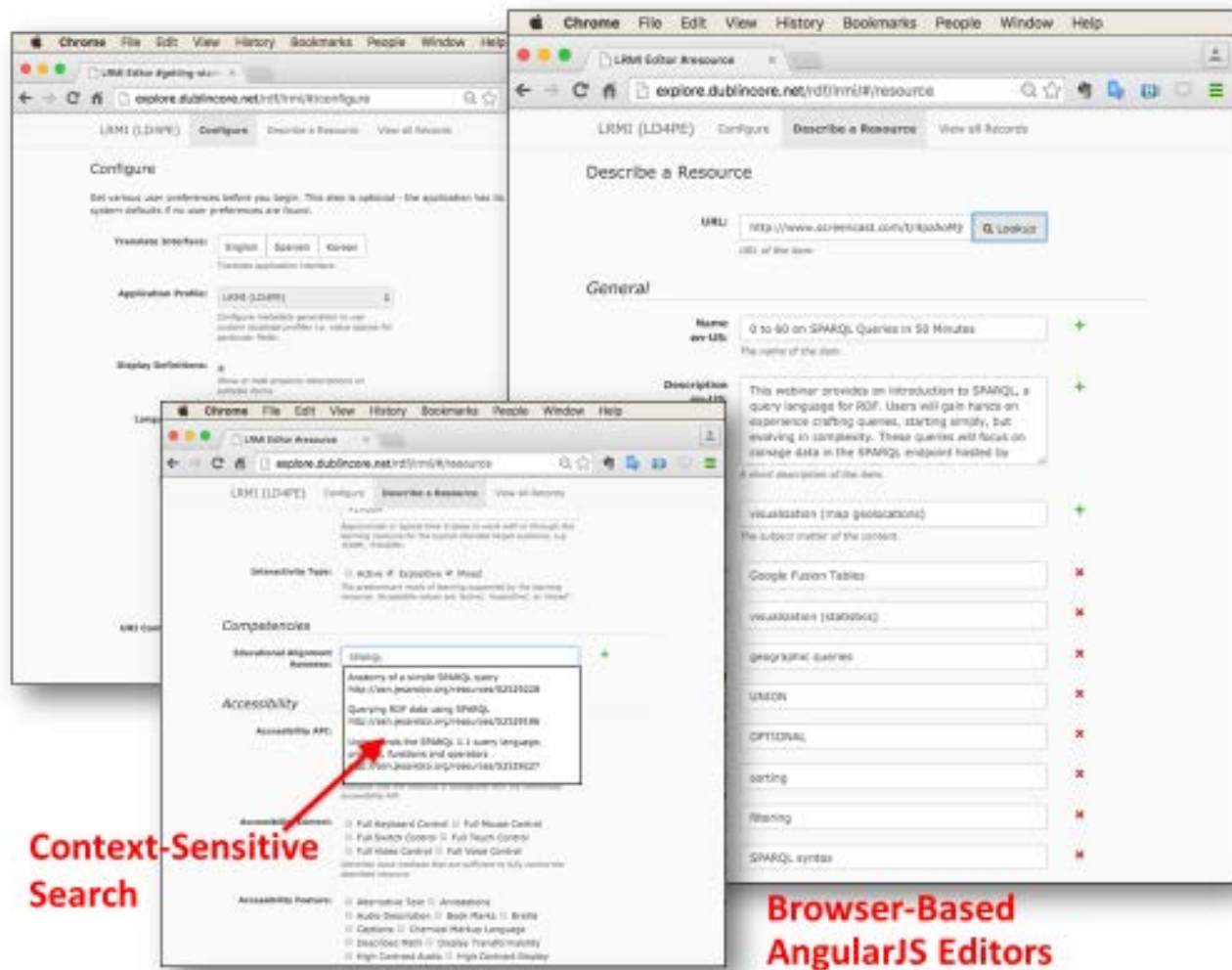
[A] Creating Linked Data applications

[B] Storing RDF data

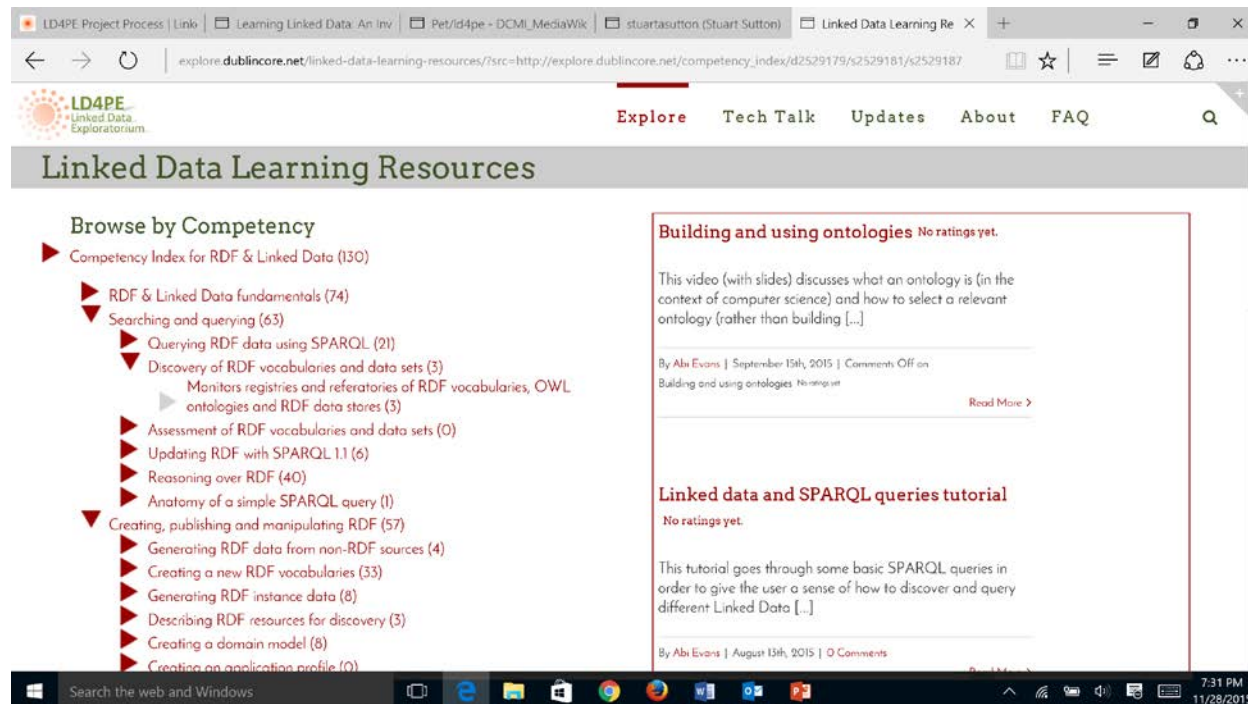
[B] Linked Data application architecture

[B] Linked Data mashups

## Appendix D: Screenshots of Learning Resource Editor



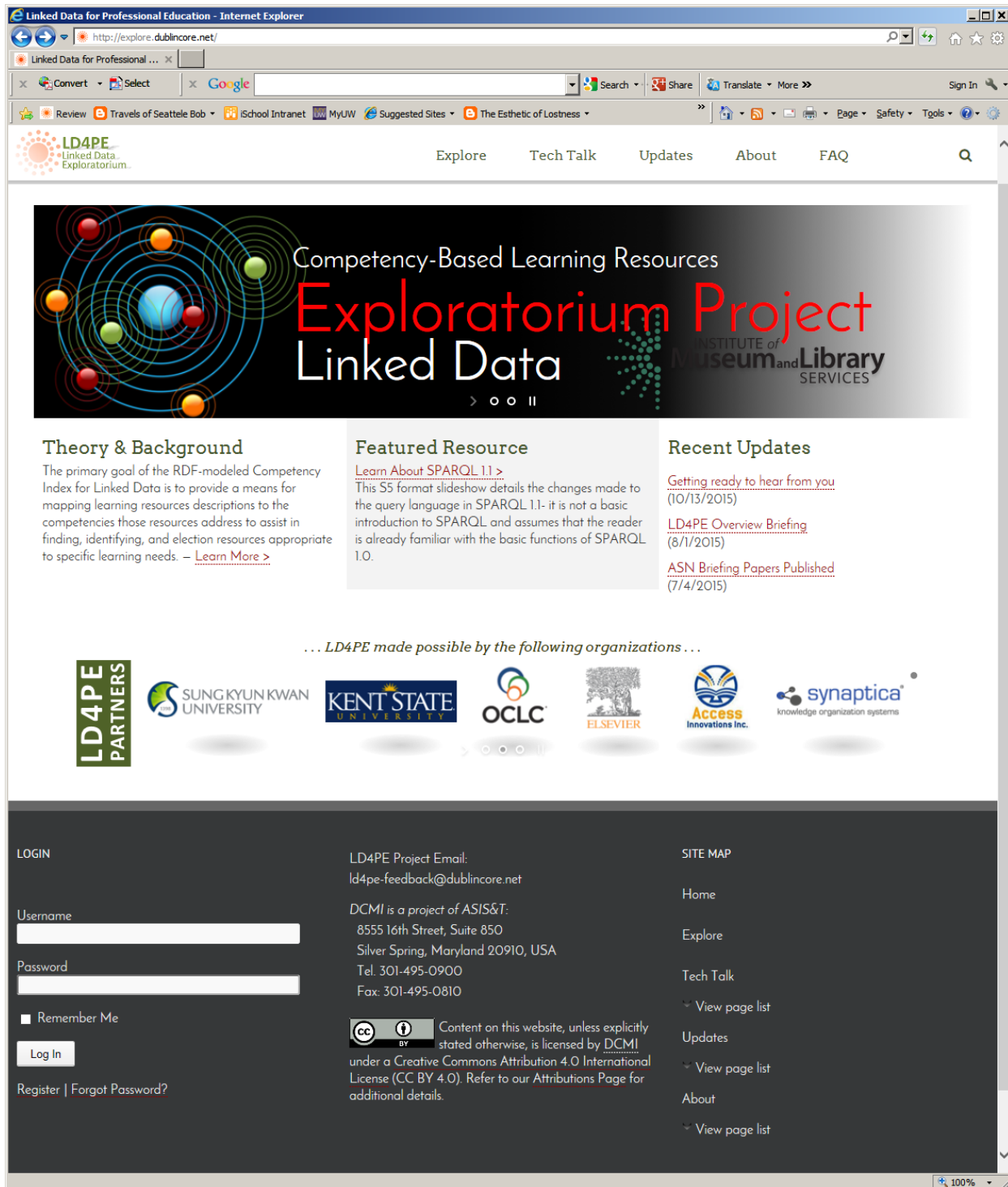
<http://explore.dublincore.net/rdf/lrmi/#/home>

**Appendix E: Screen Shot of Resources Display through Competency Index**

[http://explore.dublincore.net/linked-data-learning-resources/?src=http://explore.dublincore.net/competency\\_index/d2529179/s2529181/s2529187/](http://explore.dublincore.net/linked-data-learning-resources/?src=http://explore.dublincore.net/competency_index/d2529179/s2529181/s2529187/)



## Appendix F: Screenshot of LD4PE Exploratorium Homepage



<http://explore.dublincore.net>

## Appendix G: LD4PE Briefing Papers

Linked Data for Professional Education - Briefing Papers - Internet Explorer

http://explore.dublincore.net/theory/briefing-papers/

LD4PE Linked Data Exploratorium

Explore Tech Talk Updates About FAQ

### Briefing Papers

Tech Talk  
Competency Index  
Overview  
Briefing Papers

SPARQL Graph  
Linked Data  
Triple Query  
Dataset RDF  
LD4PE

Categories

- > Briefing Papers
- > Overview Briefings
- > Technical Briefings
- > Uncategorized

ASN Briefing #1: ASN-DL Overview  
Overview of the ASN Description Language (ASN-DL) including the model, extension, and description of select mapping properties.  
<http://explore.dublincore.net/asn-briefing-1/>

ASN Briefing #2: ASN Ontology  
Definition of the Achievement Standards Network ontology including full description of all classes and properties.  
<http://explore.dublincore.net/asn-briefing-2/>

ASN Briefing #3: Introduction and specification of ASN "Profiles"  
Description of mechanisms for extension and refinement of the ASN-DL to meet national or organizational needs.  
<http://explore.dublincore.net/asn-briefing-3/>

ASN Briefing #4: LD4PE Overview  
High-level overview of the Linked Data for Professional Education (LD4PE) project.  
<http://explore.dublincore.net/briefing-papers/ld4peoverview/>

LOGIN

Username

Password

☐ Remember Me

Log In

Register | Forgot Password?

LD4PE Project Email:  
ld4pe-feedback@dublincore.net

DCMI is a project of ASIS&T:  
8555 16th Street, Suite 850  
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<http://explore.dublincore.net/theory/briefing-papers/>

<sup>i</sup> <http://www.lrmi.net/the-specification>

<sup>ii</sup> <http://www.thegateway.org/>