

## Planning a Platform for Learning Linked Data

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### Abstract

This poster describes a project under development to create an online environment in support of students and professionals in libraries, museums, and archives for learning the principles and practices of Linked Data. The environment envisioned includes instructional resources for personal study and use as supporting learning resources in formal and informal teaching and training. The project will work at the intersection of a number of current threads in support for anytime, anywhere teaching and learning: (1) the rapid develop of instructional components in the form of microtutorials as seen in the Kahn Academy;<sup>1</sup> and (2) the developing focus in education on organization of learning resources based on the competencies and learning outcomes those resources enable. The project will build on the outcomes of a one-year planning grant from IMLS to engage educators, trainers, technologists and application developers in envisioning such an environment.

Linked Data is data that fits into a “cloud” of interconnected data sources, whether those sources are published world-readably on the Web (Linked Open Data) or behind corporate or institutional firewalls (Linked Enterprise Data). Cultural memory institutions increasingly see compatibility with Linked Data as an opportunity to enrich library resources with links to and from resources on the wider Web. The rapid emergence of Linked Data as a trend has everyone scrambling to catch up -- not just working professionals in libraries and museums, but also the information-school faculty and professional trainers responsible for teaching the next generation.

The “Learning Linked Data” project,<sup>2</sup> funded through September 2012 by a one-year planning grant under IMLS's National Leadership program,<sup>3</sup> envisioned an online environment for learning the principles and practice of Linked Data—a “language lab” of software tools and methods for processing and analysis. To further develop this idea, the project held a workshop with twenty instructors, students, and technology experts in February 2012 on the campus of the project lead, the Information School at the University of Washington. The final report of the Learning Linked Data planning project is available on a blog of the University of Washington iSchool.<sup>4</sup>

While agreeing on overall goals, the workshop participants identified a dauntingly wide range of potential users, from mid-career professionals seeking to learn enough to solve problems on the job to students seeking professional qualification (and their instructors!) and from students of knowledge management with only basic computing skills to computer science students with no background in knowledge management. This diversity of potential learners made it unrealistic to target any one pedagogical approach. Rather, the group focused on building consensus around an

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<sup>1</sup> <https://www.khanacademy.org/>

<sup>2</sup> <http://lld.ischool.uw.edu/about/>

<sup>3</sup> [http://www.imls.gov/news/national\\_leadership\\_grant\\_announcement.aspx#WA](http://www.imls.gov/news/national_leadership_grant_announcement.aspx#WA)

<sup>4</sup> <http://lld.ischool.uw.edu/wp/report/>

Inventory of Learning Topics<sup>5</sup>—a common set of analytical and software skills required by, and adaptable to, a wide range of learning contexts, independently of pedagogical approach.

The Inventory focuses on four key topic areas—querying Linked Data, creating new data, visualizing webs of data, and implementing Linked Data applications—and characterizes the technical competencies needed by learners within each area. A draft Inventory was posted on a University of Washington blog for input from a larger circle of colleagues, who responded both on the blog and by email describing their own instructional scenarios or pointing to tools. Citing the difficulty of querying and navigating a vast and evolving landscape of software technology based on conventional topicality and without the sort of guideposts provided by concrete learning outcomes, many confirmed an interest in using a resource discovery platform based on the Inventory's key topics when tied to the individual competencies and learning outcomes that individual learning resources address. Functionally, the organizational framework of the platform to be explored and developed in the follow-on project is as follows:

- Key Linked Data Topic
  - Competencies
    - Learning Outcomes

Competencies are related sets of knowledge and processes that make up discrete sub-areas of learning within the key topics. In essence, competencies frame desired learning goals. Learning outcomes are what learners should know and be able to do in response to a learning experience. Thus, learning outcomes are the bases for measurable assessments of the proficiency with which the learner has mastered the knowledge, skills and habits of mind that make up a given competency (Institute, 2010, p.37). Individual learning resources in the LD4E will be indexed (linked) to the learning outcomes that they aid the learner in developing. Such a framework supports learner entry into a repository or referatory of learning resources through either topic or learning outcome. The use of Linked Data principles with the competencies and learning outcomes provides the means for learners and teachers/trainers to construct individualized, navigable learning maps of a topical area within the domain of Linked Data. The intrinsic power of machine-readable competencies and learning outcomes in learning contexts has been recognized (Ward & Nicholson, 2010).

Technically and conceptually, the project will follow the metadata framework of the Achievement Standards Network (ASN)—an RDF-based modeling for machine-readable descriptions of competencies and learning outcomes.<sup>6</sup> The extensible ASN framework was developed with support from the National Science Foundation and the Bill and Melinda Gates Foundation. Currently, the framework is being used as the metadata foundation for: (1) the comprehensive ASN-US RDF repository of learning outcomes for K-12 in the 50 U.S. states and territories; (2) competencies of relevant professional societies;<sup>7</sup> and, (3) for the Australian repository of learning outcomes.<sup>8</sup> The ASN-US repository and related metadata generation tools will provide the LD4E project with the means to encode and published the project's learning outcomes as Linked Data.

This project concept is being developed into a proposal to be submitted to IMLS or other funders in the coming year. The project plans to partner with the Dublin Core Metadata Initiative in developments and deployment of the learning resource environment in order to anchor the work in a sustainable context beyond the two years of the project itself.

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<sup>5</sup> <http://lld.ischool.uw.edu/inventory>

<sup>6</sup> <http://asn.jesandco.org/>

<sup>7</sup> <http://asn.jesandco.org/resources/ASNJurisdiction>

<sup>8</sup> <http://www.australiancurriculum.edu.au/Technical/Introduction>

It was decided that such a follow-on project to the IMLS planning grant should engage instructors and learners in a dialogue with software developers. The project should link desired learning outcomes to a growing collection of targeted microtutorials—learning resources ranging from simple “how-to” documents to playable screencasts and interactively editable coding environments.

## **References**

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